

Mercury - is the danger real?

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Er kvikksølv farlig ?

- Ja
- Gjett om
- Jepp
- Jada
- Definitivt
- Ikke noe å lure på
- Utvilsomt
- Åpenbart



Kvikksølv for nybegynnere

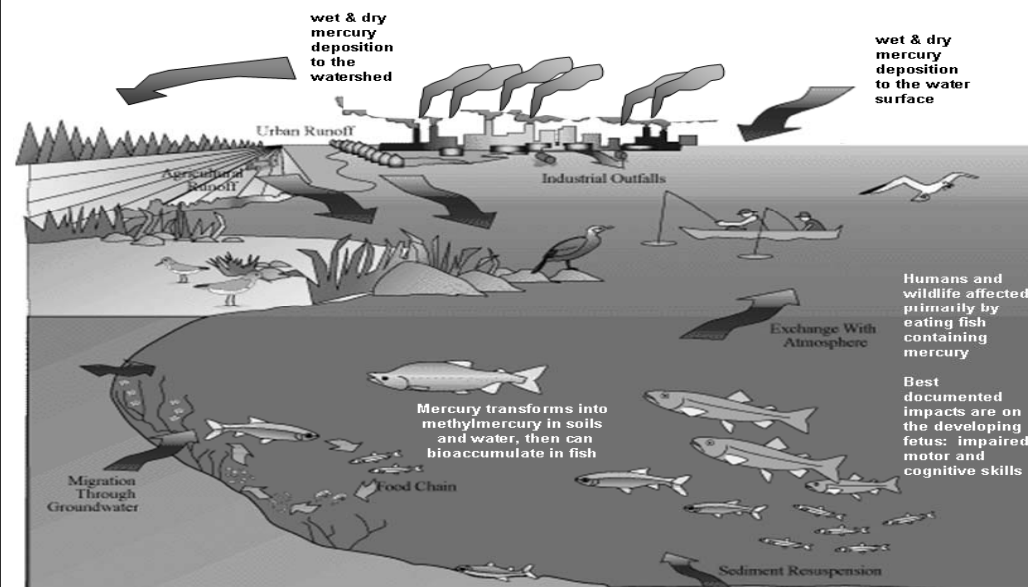
Mercury is a highly toxic element that is found both naturally and as an introduced contaminant in the environment. Although its potential for toxicity in highly contaminated areas such as Minamata Bay, Japan, in the 1950's and 1960's, is well documented, research has shown that mercury can be a threat to the health of people and wildlife in many environments that are not obviously polluted.



www.usgs.gov



Hvor finner vi kvikksølv





Miljøstatus i Norge

Kilde: Statens forurensingstilsyn

- Kvikksølv har lang halveringstid, akkumulerer i organismer og oppkonsentreres i næringskjeden, og er derfor mest skadelig for dyr (oss) på toppen av næringskjeden.
- Kvikksølv kan gi nyreskader og motoriske og mentale forstyrrelser som følge av skader på sentralnervesystemet. Kvikksølv bioakkumuleres først og fremst i nyrene og i hjernen. Kvikksølv kan gi fosterskader. Kvikksølv kan også føre til kontaktallergi.
- Kvikksølvforbindelser kan gi kroniske giftvirkninger, selv i meget små konsentrasjoner.
- Langtransporterte forurensninger fra andre land bidrar med større tilførsler av kvikksølv til norsk natur enn norske utslipp.



Lover og reguleringer

- Fra 1. januar 2008 er det innført et generelt forbud mot kvikksølv i produkter
- Forbud mot amalgam i tannbehandling, unntatt til spesielle pasientgrupper.
- Kvikksølvholdige termometre ble forbudt allerede i 1998.
- Det er forbud mot kvikksølv i emballasje og batterier (unntatt knappcelle batterier).
- Det er forbudt å bruke kvikksølv i de fleste EE-produkter, med unntak for lyskilder.
- Kvikksølvbrytere i biler skal tas ut før bilen vrakes.
- Forurensningsforskriften stiller krav om tiltak for å redusere utslipp av kvikksølv fra krematorier.

Utslipp av kvikksølv i 2005
(totalt ca. 1 tonn)



Kilde: Statens forurensingstilsyn, 2008
www.miljostatus.no



Miljøstatus i Norge

Kostholdsråd: www.miljostatus.no

- I en del fjorder og havner er innholdet av miljøgifter så høyt at det kan være helseskadelig å spise fisk og skaldyr fra disse områdene. Her har Mattilsynet innført kostholdsråd. De fleste kostholdsrådene skyldes PCB eller PAH i fiskelever eller blåskjell
- Barn, kvinner i fruktbar alder, gravide og ammende bør ikke spise fiskelever eller pålegg laget av fiskelever. Andre grupper i befolkningen bør begrense inntaket av slik mat. Konsum av fiskelever fra spesielt forurensede områder frarådes helt.
- Gravide og ammende bør unngå å spise gjedde, abbor over 25 cm, og stor ørret og røye (over 1 kilo) Andre bør ikke spise slik fisk mer enn en gang i måneden.



Tre former for kvikksølv

- **Grunnstoffet/metallet kvikksølv**
 - Er flytende ved romtemperatur. Fordamper til en luktfri og usynlig giftig gass som lett kan spres over store avstander.
- **Inorganisk kvikksølv eller kvikksølvsalter**
 - kvikksølv som er bundet til andre stoffer enn karbon, som svovel, klor eller oksygen. Slike kvikksølvforbindelser har vært brukt i soppdrepende, antiseptiske og desinfiserende midler.
- **Organisk kvikksølv**
 - Mikrober omdanner inorganisk kvikksølv til organisk kvikksølv.
 - Metylkvikksølv (fisk) og etylkvikksølv (thimerosal i vaksiner)
 - Det er det organiske kvikksølvet som virkelig er farlig



Kvikksølveksponering

- Hva alle kan enes om

People may be exposed to mercury in any of its forms under different circumstances. The factors that determine how severe the health effects are from mercury exposure include these:

- the chemical form of mercury
- the dose
- the age of the person exposed (the fetus is the most susceptible)
- the duration of exposure
- the route of exposure -- inhalation, ingestion, dermal contact, etc.
- the health of the person exposed.

Kilde: EPA, The environmental protectiv agency www.EPA.gov/mercury



Metylkvikksølv (methylmercury)

a developmental neurotoxicant

- For fetuses, infants, and children, the primary health effect of methylmercury is impaired neurological development.
- Methylmercury exposure in the womb, which can result from a mother's consumption of fish and shellfish that contain methylmercury, can adversely affect a baby's growing brain and nervous system. Impacts on cognitive thinking, memory, attention, language, and fine motor and visual spatial skills have been seen in children exposed to methylmercury in the womb.
- Additional symptoms of methylmercury poisoning may include; impairment of the peripheral vision; disturbances in sensations ("pins and needles" feelings, usually in the hands, feet, and around the mouth); lack of coordination of movements; impairment of speech, hearing, walking; and muscle weakness.

Kilde: EPA, The environmental protectiv agency www.EPA.gov/mercury



Elemental mercury

Kvikksølv damp – fremdeles enighet...

- Elemental (metallic) mercury primarily causes health effects when it is breathed as a vapor where it can be absorbed through the lungs. These exposures can occur when elemental mercury is spilled or products that contain elemental mercury break and expose mercury to the air, particularly in warm or poorly-ventilated indoor spaces.
- Symptoms include these: tremors, emotional changes (e.g., mood swings, irritability, nervousness, excessive shyness), insomnia, neuromuscular changes (such as weakness, muscle atrophy, twitching), headaches, disturbances in sensations, changes in nerve responses, performance deficits on tests of cognitive function.
- At higher exposures there may be kidney effects, respiratory failure and death.



Other forms of mercury

(inorganic and organic)

- High exposures to inorganic mercury may result in damage to the gastrointestinal tract, the nervous system, and the kidneys. Both inorganic and organic mercury compounds are absorbed through the gastrointestinal tract and affect other systems via this route. However, organic mercury compounds are more readily absorbed via ingestion than inorganic mercury compounds.
- Symptoms of high exposures to inorganic mercury include: skin rashes and dermatitis; mood swings; memory loss; mental disturbances; and muscle weakness.



Thimerosal: Slutt på enigheten

- Alle former for kvikksølv ser ut til å være skadelige, med unntak av Thimerosal (ethylmercury) som var (er) tilsatt i vaksiner
- Symptomene på kvikksølvforgiftning er til forveksling lik mange av symptomene på autisme, men det er ingen sammenheng mellom tungmetaller og autisme
- Kvikksølvpåvirkning i fosterlivet kan gi utviklingsforstyrrelser, men det er ingen sammenheng mellom kvikksølv og autisme



Thimerosal dokumentasjon

TEACH Database: <http://www.epa.gov/teach>

- Thimerosal is a compound that contains mercury, and when metabolized in the body, forms ethylmercury. Ethylmercury has been detected in blood, urine, and feces of infants who were vaccinated with thimerosal-containing vaccines. Levels of mercury in blood and feces of infants who had received routine immunizations were measured, and were found to be within safety guidelines set for methylmercury exposure by the U.S. FDA, U.S. ATSDR, and World Health Organization. Mercury was excreted by thimerosal-exposed infants in blood and feces at a faster rate than expected for methylmercury, suggesting that thimerosal and methylmercury are metabolized and excreted differently.
- Interpretations of studies of possible links between autism in children and exposure to ethylmercury from thimerosal in vaccines have been the subject of controversy. Some studies suggested a link between ethylmercury exposure from thimerosal in some vaccines with autism and other neurological disorders in children, while other studies found no such association. Several scientific and public policy review committees carefully evaluated available data on this issue, and concluded that the evidence suggesting a link between autism and thimerosal was not sufficient. Weighing available information with public health concerns, the American Academy of Pediatrics and the U.S. Public Health Service recommended that thimerosal be phased out of vaccines beginning in 1999



Gode motargumenter

- Geier & Geier. Parents' worries about thimerosal in vaccines are well founded!
<http://pediatrics.aappublications.org/cgi/eletters/112/6/1394>
- Mercury and autism: accelerating evidence?
Neuro Endocrinol Lett. 2005 Oct;26(5):439-46. Mutter J, Naumann J, Schneider R, Walach H, Haley B.
- Thimerosal and Measles Mumps and Rubella (MMR) Citations. Collected by: Teresa Binstock
<http://www.generationrescue.org/autism/13-thimerosal-binstock-citations.htm>
- Safeminds

www.safeminds.org/research/peer-reviewed-publications.html
<http://www.safeminds.org/mercury/table-comparison-traits.pdf>
<http://www.safeminds.org/mercury/table-biologic-abnormalities-in-autism-and-mercury.pdf>



Reduced levels of mercury in first baby haircuts of autistic children.

Holmes AS, Blaxill MF, Haley BE

Int J Toxicol. 2003 Jul-Aug;22(4):277-85

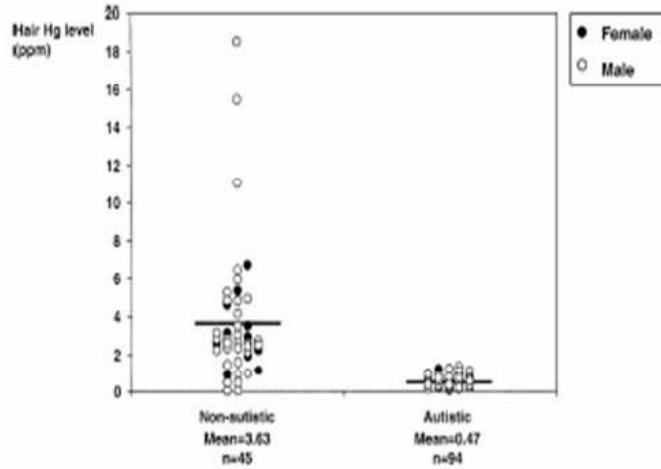
- Hair mercury levels in the autistic group were 0.47 ppm versus 3.63 ppm in controls, a significant difference.
- The mothers in the autistic group had significantly higher levels of mercury exposure through Rho D immunoglobulin injections and amalgam fillings than control mothers.
- Within the autistic group, hair mercury levels varied significantly across mildly, moderately, and severely autistic children.
- Hair mercury levels among controls were significantly correlated with the number of the mothers' amalgam fillings and their fish consumption as well as exposure to mercury through childhood vaccines, correlations that were absent in the autistic group.
- Hair excretion patterns among autistic infants were significantly reduced relative to control.



Reduced levels of mercury in first baby haircuts of autistic children.

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A Case-Control Study of Mercury Burden in Children with Autistic Spectrum Disorders

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ABSTRACT

Large autism epidemics have recently been reported in the United States and the United Kingdom. Emerging epidemiologic evidence and biologic plausibility suggest an association between autistic spectrum disorders and mercury exposure.

This study compares mercury excretion after a three-day treatment with an oral chelating agent, meso-2,3-dimercaptosuccinic acid (DMSA), in children with autistic spectrum disorders and a matched control population. Overall, urinary mercury concentrations were significantly higher in 221 children with autistic spectrum disorders than in 18 normal controls (Relative Increase (RI)=3.15; $P < 0.0002$). Additionally, vaccinated cases showed a significantly higher urinary mercury concentration than did vaccinated controls (RI=5.94; $P < 0.005$). Similar urinary mercury concentrations were observed among matched vaccinated and unvaccinated controls, and no association was found between urinary cadmium or lead concentrations and autistic spectrum disorders.

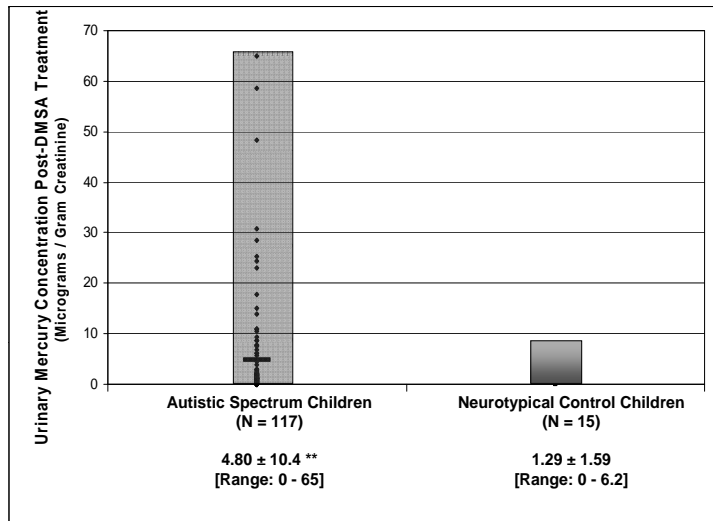
The observed urinary concentrations of mercury could plausibly have resulted from thimerosal in childhood vaccines, although other environmental sources and thimerosal in Rh₀(D) immune globulin administered to mothers may be contributory.

Regardless of the mechanism by which children with autistic spectrum disorders have high urinary mercury concentrations, the DMSA treatment described in this study might be useful to diagnose their present burden of mercury.

Population Type	Number of Boys	Number of Girls	Mean Age in Years (Range)	Mean Urinary Mercury (mcg/g creatinine) (Range)
Cases	183	38	6.25 (3 to 15)	4.06 ± 8.59 (0 to 58.65)
Controls	14	4	8.65 (3 to 16)	1.29 ± 1.54 (0 to 6.2)

Slide courtesy of Dr. Jeff Bradstreet

Bradstreet, et al: A summary of the urinary mercury concentrations of the provocation cases and controls (control group I)



All p-values determined using the t-test statistic

** Relative Increase = 3.72 ($P < 0.002$)

Slide courtesy of Dr. Jeff Bradstreet

Proximity to point sources of environmental mercury release as a predictor of autism prevalence

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Abstract

The objective of this study was to determine if proximity to sources of mercury pollution in 1998 were related to autism prevalence in 2002. Autism count data from the Texas Educational Agency and environmental mercury release data from the Environmental Protection Agency were used. We found that for every 1000 pounds of industrial release, there was a corresponding 2.6% increase in autism rates ($p < .05$) and a 3.7% increase associated with power plant emissions ($P < .05$). Distances to these sources were independent predictors after adjustment for relevant covariates. For every 10 miles from industrial or power plant sources, there was an associated decreased autism Incident Risk of 2.0% and 1.4%, respectively ($p < .05$). While design limitations preclude interpretation of individual risk, further investigations of environmental risks to child development issues are warranted.

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Keywords: Mercury; Autism; Environment; Distance; Industry



The Severity of Autism Is Associated with Toxic Metal Body Burden and Red Blood Cell Glutathione Levels

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This study investigated the relationship of children's autism symptoms with their toxic metal body burden and red blood cell (RBC) glutathione levels. In children ages 3–8 years, the severity of autism was assessed using four tools: ADOS, PDD-BI, ATEC, and SAS. Toxic metal body burden was assessed by measuring urinary excretion of toxic metals, both before and after oral dimercaptosuccinic acid (DMSA). Multiple positive correlations were found between the severity of autism and the urinary excretion of toxic metals. Variations in the severity of autism measurements could be explained, in part, by regression analyses of urinary excretion of toxic metals before and after DMSA and the level of RBC glutathione (adjusted R² of 0.22–0.45, P<.005 in all cases). This study demonstrates a significant positive association between the severity of autism and the relative body burden of toxic metals.

Journal of Toxicology, July 2009

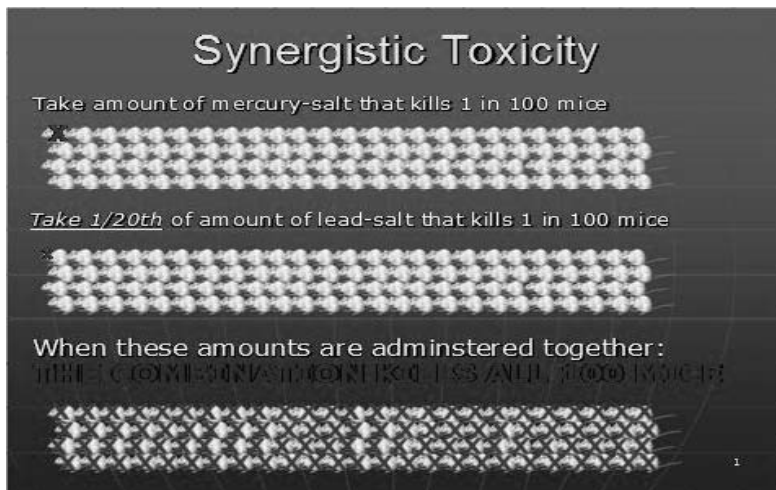


Andre sykdommer assosiert med kvikksølvbelastning

- Kronisk tretthet
- Hjerte og kar sykdom
- Alzheimer
- Parkinson
- Allergier
- MS
- Fibromyalgi
- Angst og depresjon



Synergistic toxicity



Shubert et al. J of Toxicology & Environmental Health 4:763, 1978



Oppsummering

- Stor enighet om at alle former for kvikksølv, med unntak av thimerosal, er svært skadelig
- Kvikksølv er mer skadelig for fostere og små barn, og gir økt risiko for utviklingsforstyrrelser
- Barn med autisme har mange liknende symptomer som dem man ser ved kvikksølvforgiftning, både akutt og kronisk
- Barn med autisme ser ut til å skille ut mindre kvikksølv enn det man skulle forvente sammenlignet med friske kontroll
- Barn med autisme skiller ut mer kvikksølv enn friske kontroll etter inntak av DMSA
- Barn med autisme har mange biokjemiske likhetstrekk med kvikksølvforgiftede
- Thimerosal er fjernet fra de fleste vaksiner og bruken av kvikksølv er redusert
- Kvikksølv er bare en av miljøgiftene som påvirker våre barn (og oss)

Takk for oppmerksomheten!

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