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The World's No.1 Science & Technology News Service**Toxic metal clue to autism**

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Exclusive from New Scientist [Print Edition](#)

A study of mercury levels in the baby hair of children who were later diagnosed with autism has produced startling results. The babies had far lower levels of mercury in their hair than other infants, leading to speculation that autistic children either do not absorb mercury or, more likely, cannot excrete it.

The results will be seized upon by parents who blame vaccines containing the mercury-based preservative thimerosal for their children's autism, some of whom are suing health authorities in the US and Canada. (The MMR vaccine that some accuse of triggering autism, despite a lack of credible evidence, does not contain mercury.)

But while the study's findings support the theory that some children have a genetic fault that makes them far more susceptible to mercury poisoning, the results certainly do not prove this, or that thimerosal is involved.

The difference in mercury levels in hair may be a sign of a more general problem in dealing with metals or it could simply be an anomaly that reveals little about what is happening elsewhere in the body.

But if the results are confirmed, the conclusions of studies looking at the safety of low levels of mercury (**New Scientist** print edition, 14 June) could also be called into question. Many of these studies relied on mercury levels in hair as a measure of exposure.

First cuttings

Autism experts say the findings are intriguing, but all emphasise the need for further studies. Although the findings are to be published in a peer-reviewed journal, some critics say the results are rather too striking, and point out that the researchers who did the work all believe that thimerosal is to blame for autism.

The team leader, Louisiana doctor Amy Holmes, in fact set out to try to prove that autistic children had been exposed to high levels of mercury. She obtained baby hair from parents who had kept the first cuttings and sent off a few samples for analysis. To her surprise, mercury levels were low.



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Holmes has now done a bigger study, comparing mercury levels in first baby haircuts from 94 autistic children with those of 45 other children. The mean level in the baby hair of children later diagnosed as autistic was 0.47 parts per million, compared with 3.63 ppm in the others, the team found - nearly nine-tenths lower.

What is more, the more severe the autism, the lower the mercury levels. The mean levels of children with mild, moderate and severe autism were 0.79, 0.46 and 0.21 ppm respectively.

Fillings and fish

Most of this mercury came from the mothers. The main sources of exposure, according to the team, were mercury amalgam fillings, Rho D immunoglobulin injections containing thimerosal given to Rhesus negative mothers, and heavy consumption of fish (defined as more than five fish meals a month).

In the control group, hair mercury rose in line with the mothers' exposure. But the baby hair of autistic children had consistently low mercury levels, even when the mothers' exposure was high, the team found. The results will appear in the *International Journal of Toxicology* in September.

One explanation, says team member Mark Blaxill of the campaign group SafeMinds of Cambridge, Massachusetts, is a problem with metal uptake. If so, autistic children might also be deficient in metals essential for brain development such as zinc, iron and copper.

Alternatively, some children may have a problem excreting mercury. The metal might then build up in the brain, producing autism. Most mercury is excreted in urine and faeces, but the lack of mercury in hair might be a sign that the metal is being retained in cells rather than getting into the blood, the researchers suggest.

Mercury is one of the suspected causes of autism, with proponents arguing that there are many similarities between autism and mercury poisoning. But a review published earlier in 2003 pointed out that poisoning by the different forms of mercury found in fish, fillings and thimerosal has effects distinct from autism, and concluded that what little evidence there is does not support any link.

'Loaded to the gills'

Despite this, some doctors, including Holmes, have been experimenting with giving autistic children metal-binding agents, or chelators, to rid the body of heavy metals. "They are loaded to the gills with metals," Holmes, who was unavailable for comment, claimed in 2002. The only published evidence, however, is a very small study from 1976 suggesting autistic children have higher levels of lead in their blood.

Critics such as child neurologist Emanuel Dickey-Bloom of the Robert Wood Johnson Medical School in New Jersey says concluding that autistic children accumulate mercury on the basis of low levels in hair is a big logical leap that is not justified by the evidence.

Even some of those who blame heavy metals such as mercury for

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autism echo his warnings not to try potentially dangerous therapies such as chelation. Parents should wait for the results of the clinical trials about to begin, they say.

And Dicicco-Bloom's colleague Mike Gochfield, who does mercury testing, says that the levels of mercury in the control group are way above what he would expect for children in the US. Blaxill's response is that no one has ever tested first baby haircuts before, so there are no "normal" results to compare to.

The lab that did the testing was not told which children the samples were from, he adds. And according to unpublished work by Steve Lindow and Steve Haslow at the University of Hull in the UK, hair mercury levels in newborns can be even higher than in the mother.

Active transport

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They suspect that mothers may actively transport metals to the fetus. But on average the first baby hair in Holmes' study was cut at 18 months old, so this would not explain the high levels in the controls.

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Astonishingly, only one other published study, from 1985, has compared mercury levels in the hair of children with and without autism. That study found no difference, but it did find lower levels of metals such as calcium, copper and chromium - levels that were so distinctive they could be used as a "diagnostic tool for autism".

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Other experts say the theory that autistic children are particularly at risk from heavy metals is at least plausible.

"This kind of gene-environment interaction is not incompatible with the known heritability of autism," says Simon Baron-Cohen of Cambridge University. "If these results hold up, metal studies on the brain could be revealing."

Richard Lathe and Michael Le Page

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