

Autism Research Review

I N T E R N A T I O N A L

A quarterly publication of the Autism Research Institute

Reviewing biomedical and educational research in the field of autism and related disorders

Methylation: the link between thimerosal and autism?

Rates of autism have climbed dramatically over the past three decades, a trend paralleled by the escalating numbers of thimerosal-laden vaccines given to children since the 1970s. A possible explanation for this link comes from new research by Richard Deth and colleagues, who report that exposure to even low levels of thimerosal, a vaccine preservative that is nearly 50 percent mercury, can drastically alter a critical process called methylation.

Methylation occurs when methyl groups (molecules consisting of one carbon atom and three hydrogen atoms) are added to or subtracted from other molecules. Because this process regulates DNA function and gene expression, proper methylation is critical to normal neurological development.

Deth et al. found that methylation is stimulated by insulin-like growth factor-1 (IGF-1) and the neurotransmitter dopamine. The researchers discovered that thimerosal inhibits these pathways, even at concentrations typically found following vaccination. They also found that ethanol and lead inhibit methylation, but Deth says that thimerosal "was by far the most potent" inhibitor. Thimerosal, he says, disrupted the methylation process at doses 100 times lower than a child would receive after a single dose of a thimerosal-containing vaccine.

"Scientists certainly acknowledge that exposure to neurotoxins like ethanol and heavy metals can cause developmental disorders, but until now, the precise mechanisms underlying their toxicity have not been known," Deth says. "The recent increase in the incidence of autism led us to speculate that environmental exposures, including vaccine additives, might contribute to the triggering of this disorder."

The researchers say thimerosal appears to interfere with methylation by inhibiting the biosynthesis of methylcobalamin, the active form of vitamin B12. (*Editor's note: this finding is of particular interest because doctors using the Defeat Autism Now! [DAN!] approach are reporting dramatic improvements in many autistic children receiving injected methylcobalamin.*)

Deth says thimerosal may also play a role in attention deficit hyperactivity disorder

(ADHD), another behavioral problem that is on the rise. "During the first years of life, networks of neurons that represent the matrix for learning are being developed in the brain," he says. "Methylation and the development of neuronal cells to create these networks are critical during this time. If the process is interrupted, the ability to learn and pay attention would naturally be impaired."

Reports that autism rates have not dropped since drug companies started phasing out thimerosal from some vaccines do not disprove the thimerosal-autism link, Deth says. "The epidemiological studies are looking at whole populations," he comments, "and we are trying to determine what it is about an individual kid that might make him more susceptible to this exposure."

Deth cautions that his research group's findings are preliminary, but calls for more research into the possible link between autism and thimerosal. "Up to now, people have said the cause or causes of autism are unknown," Deth says. "Our work isn't final in any sense at all, but it seems to point to this biochemistry as a potential, or even primary, cause of autism."

In 1999, the FDA requested that manufacturers eventually reduce or eliminate the mercury in vaccines, but thimerosal-containing vaccines are still being used.

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"Activation of methionine synthase by insulin-like growth factor-1 and dopamine: a target for neurodevelopmental toxins and thimerosal," 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, and R. C. Deth, *Molecular Psychiatry*, January 27, 2004 (epub). Address: Richard C. Deth, Dept. of Pharmaceutical Sciences, Northeastern University, Boston, MA 02115.

—and—
"New research suggests link between vaccine ingredients and autism, ADHD," news release, Northeastern University, February 5, 2004.

—and—
"Study suggest vaccine, autism link," Salynn Boyles, WebMD, February 5, 2004.

—and—
"Vaccine additive linked to brain damage in children," Sharon Kirkey, Canadian Press, February 5, 2004.

Comment:

The real conflict of interest

Bernard Rimland, Ph.D.

Andrew Wakefield is one of the most honorable, brilliant, and courageous men I have ever had the pleasure of knowing. His pioneering research, which identified a unique inflammatory bowel disorder linked to autism and also implicated the MMR vaccine in this disorder (see ARRI 17/4, 16/2, and 16/1), moved our knowledge of autism a giant step forward.

Unfortunately, this research also made Dr. Wakefield a target of powerful drug-industry and government officials who oppose any research that sheds light on the dangers of vaccines. As a result, a concerted campaign to smear Dr. Wakefield is underway.

Dr. Wakefield is currently accused of having a conflict of interest regarding research published in *The Lancet*, because he accepted a research grant from the United Kingdom's publicly funded Legal Aid Board to investigate children whose parents are suing the British government because they believe vaccines caused their children's autism. But an investigation published in Britain's *Daily Mail* and aptly entitled "The Smearing of Andrew Wakefield," details the timelines of the study in *The Lancet* and the entirely separate research funded by Legal Aid. The article notes that several of the children in the Legal Aid study were taking part in legal action against vaccine makers, but that "their parents only decided to go to court after they had been accepted for treatment by [Dr.] Wakefield's team at London's Royal Free hospital."

The article concludes, "The implication that [these children] were selected because they were litigants with a financial interest in the results of the clinical examination is grotesque. All twelve of them were referred through normal NHS processes, either from doctors' recommendations or after desperate parents, having heard on the grapevine of Wakefield's unusual sympathy toward these problems, had contacted him of their own volition."

As to *The Lancet's* claim that Dr. Wakefield should have informed them of the second study, Dr. Wakefield had in fact de-

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