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Study finds mercury levels in children with autism and those developing typically are the same

In a large population-based study published online today, researchers at the UC Davis MIND Institute report that after adjusting for a number of factors, typically developing children and children with autism have similar levels of mercury in their blood streams. Mercury is a heavy metal found in other studies to adversely affect the developing nervous system.

The study, appearing in the journal *Environmental Health Perspectives*, is the most rigorous examination to date of blood-mercury levels in children with autism. The researchers cautioned, however, that the study is not an examination of whether mercury plays a role in causing the disorder.

"We looked at blood-mercury levels in children who had autism and children who did not have autism," said lead study author Irva Hertz-Picciotto, an internationally known MIND Institute researcher and professor of environmental and occupational health. "The bottom line is that blood-mercury levels in both populations were essentially the same. However, this analysis did not address a causal role, because we measured mercury after the diagnosis was made."

The research was conducted as part of the Northern California-based Childhood Autism Risks from Genetics and the Environment (CHARGE) Study, of which Hertz-Picciotto is the principal investigator. The CHARGE Study is a large, comprehensive, epidemiologic investigation designed to identify factors associated with autism and discover clues to its origins. CHARGE study participants include children between 24 and 60 months who are diagnosed with autism, as well as children with other developmental disorders and typically developing controls.

The study looked at a wide variety of sources of mercury in the participants' environments, including fish consumption, personal-care products (such as nasal sprays or earwax removal products, which may contain mercury) and the types of vaccinations they received. The study also examined whether children who have dental fillings made of the silver-colored mercury-based amalgam and who grind their teeth or chew gum had higher blood-mercury

levels. In fact, those children who both chew gum and have amalgams did have higher blood-mercury levels.

But the consumption of fish — such as tuna and other ocean fish and freshwater fish — was far and away the biggest and most significant predictor of blood-mercury levels. Data on most possible sources of mercury — fish consumption and dental amalgams — were collected by interviews with the study subjects' parents. Information on vaccines was obtained from the child's vaccination and medical records. A few children had recently had a vaccine containing mercury, and their blood-mercury levels were not elevated.

Of the 452 participants included in the research, 249 were diagnosed with autism, 143 were developing typically and 60 had other developmental delays, such as Down syndrome. At the outset, the children with autism appeared to have significantly lower blood-mercury levels than the typically developing children. But children with autism tend to be picky eaters and, in this study, ate less fish. When adjusted for their lower levels of fish consumption, their blood-mercury concentrations were roughly the same as those of children with typical development and very similar to those found in a nationally representative sample of 1- to 5-year-old children.

Hertz-Picciotto said the CHARGE study is casting a wide net, addressing an array of exposures that originate in the home or the broader environment, as well as genes and gene expression. Because so little is known about the causes of autism, the researchers plan to look at everything from household products to medical treatments, diet and supplements, and even infections. Additionally, they will explore interactions among multiple factors.

"Just as autism is complex, with great variation in severity and presentation, it is highly likely that its causes will be found to be equally complex. It's time to abandon the idea that a single 'smoking gun' will emerge to explain why so many children are developing autism. The evidence to date suggests that, without taking account of both genetic susceptibility and environmental factors, the story will remain incomplete. Few studies, however, are taking this kind of multi-faceted approach," Hertz-Picciotto said.

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Other study authors include Peter Green, Lora Delwiche, Robin Hansen, Cheryl Walker and Isaac Pessah, all of the University of California, Davis.

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Environmental Health Perspectives (EHP) is a monthly journal of peer-reviewed research and news on the impact of the environment on human health. It is published by the National Institute of Environmental Health Sciences, a part of the U.S. Department of Health and Human Services.

The UC Davis MIND Institute, in Sacramento, Calif., was founded in 1998 as a unique interdisciplinary research center where parents, community leaders, researchers, clinicians and volunteers collaborate to study and treat autism and other neurodevelopmental disorders. More information about the institute is available on the Web at

<http://www.ucdmc.ucdavis.edu/mindinstitute/>.
