

No link between mercury exposure and autism-like behaviors, study finds

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The potential impact of exposure to low levels of mercury on the developing brain – specifically by women consuming fish during pregnancy – has long been the source of concern and some have argued that the chemical may be responsible for behavioral disorders such as autism. However, a new study that draws upon more than 30 years of research in the Republic of Seychelles reports that there is no association between pre-natal mercury exposure and autism-like behaviors.

"This study shows no evidence of a correlation between low level [mercury exposure](#) and autism spectrum-like behaviors among children whose mothers ate, on average, up to 12 meals of fish each week during pregnancy," said Edwin van Wijngaarden, Ph.D., an associate professor in the University of Rochester Medical Center's (URMC) Department of Public Health Sciences and lead author of the study which appears online today in the journal *Epidemiology*. "These findings contribute to the growing body of literature that suggest that exposure to the chemical does not play an important role in the onset of these behaviors."

The debate over fish consumption has long created a dilemma for expecting mothers and physicians. Fish are high in beneficial nutrients such as, selenium, vitamin E, lean protein, and omega-3 fatty acids; the latter are essential to [brain development](#). At the same time, exposure to high levels of mercury has been shown to lead to developmental problems, leading to the claim that mothers are exposing their unborn children to serious [neurological impairment](#) by eating fish during pregnancy. Despite the fact that the developmental consequences of low

level exposure remain unknown, some organizations, including the U.S. Food and Drug Administration, have recommended that pregnant women limit their consumption of fish.

The presence of mercury in the environment is widespread and originates from both natural sources such as volcanoes and as a byproduct of coal-fired plants that emit the chemical. Much of this mercury ends up being deposited in the world's oceans where it makes its way into the food chain and eventually into fish. While the levels of mercury found in individual fish are generally low, concerns have been raised about the cumulative effects of a frequent diet of fish.

The Republic of Seychelles has proven to be the ideal location to examine the potential health impact of persistent low level mercury exposure. With a population of 87,000 people spread across an archipelago of islands in the Indian Ocean, fishing is a both an important industry and a primary source of nutrition – the nation's residents consume fish at a rate 10 times greater than the populations of the U.S. and Europe.

The Seychelles Child Development Study – a partnership between UPMC, the Seychelles Ministries of Health and Education, and the University of Ulster in Ireland – was created in the mid-1980s to specifically study the impact of fish consumption and mercury exposure on childhood development. The program is one of the largest ongoing epidemiologic studies of its kind.

"The Seychelles study was designed to follow a population over a very long period of time and focus on relevant mercury exposure," said Philip Davidson, Ph.D., principal investigator of the Seychelles Child Development Study and professor emeritus in Pediatrics at UPMC. "While the amount of fish consumed in the Seychelles is significantly higher than other countries in the industrialized world, it is still

considered low level exposure."

The autism study involved 1,784 children, adolescents, and young adults and their mothers. The researchers were first able to determine the level of prenatal mercury exposure by analyzing hair samples that had been collected from the mothers around the time of birth, a test which can approximate mercury levels found in the rest of the body including the growing fetus.

The researchers then used two questionnaires to determine whether or not the study participants were exhibiting autism spectrum-like behaviors. The Social Communication Questionnaire was completed by the children's parents and the Social Responsiveness Scale was completed by their teachers. These tests – which include questions on language skills, social communication, and repetitive behaviors – do not provide a definitive diagnosis, but they are widely used in the U.S. as an initial screening tool and may suggest the need for additional evaluation.

The mercury levels of the mothers were then matched with the test scores of their children and the researchers found that there was no correlation between prenatal exposure and evidence of autism-spectrum-like behaviors. This is similar to the result of previous studies of the nation's children which have measured language skills and intelligence, amongst other outcomes, and have not observed any adverse developmental effects.

The study lends further evidence to an emerging belief that the "good" may outweigh the possible "bad" when it comes to [fish consumption](#) during pregnancy. Specifically, if mercury does adversely influence child development at these levels of exposure then the benefits of the nutrients found in the fish may counteract or perhaps even supersede the potential negative effects of the mercury.

"This study shows no consistent association in children with mothers with mercury level that were six to ten times higher than those found in the U.S. and Europe," said Davidson. "This is a sentinel population and if it does not exist here than it probably does not exist."

"NIEHS has been a major supporter of research looking into the human health risks associated with mercury exposure," said Cindy Lawler, Ph.D., acting branch chief at the National Institute of Environmental Health Sciences, part of National Institutes of Health. "The studies conducted in the Seychelles Islands have provided a unique opportunity to better understand the relationship between environmental factors, such as mercury, and the role they may play in the development of diseases like autism. Although more research is needed, this study does present some good news for parents."

Provided by University of Rochester Medical Center

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