

# Mercury/Selenium/Omega-3 Study In Utero Exposure Study

(aka NOAA-NIH-CDC-USM-ALSPAC Study)

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NOAA has partnered with the University of Bristol's Avon Longitudinal Study of Parents and Children (ALSPAC), National Institutes of Health (NIH), Centers for Disease Control (CDC), and University of Southern Mississippi (USM) to evaluate the simultaneous influences of in utero mercury, selenium, and omega-3 fatty acid exposures on neurological development, behavioral tendencies, and academic performance in an English population with seafood consumption patterns similar to the U.S..

The impetus for conducting this new study comes from recent research that may prove pivotal to developing a clearer understanding of the influence of seafood on public health. One recent important finding indicates that selenium provides a protective effect against mercury's toxicity at a molecular level, as long as selenium is present in greater amounts than mercury. Another important finding indicates that omega-3 fatty acid deficiency during gestation negatively influences neurological development, and behavioral tendencies.

ALSPAC is providing the bulk of the data and tissues needed for this study. ALSPAC has tracked 14,000 mother-child pairs from Avon County England from pregnancy in the early 90's to the present. The children's neurological development, academic performance, behavioral tendencies, etc. have been closely monitored since birth. The diets of the pregnant mothers were monitored and maternal blood samples were taken during pregnancy. These data and blood samples provide the basis for conducting a really powerful set of analyses.

The study will analyze the ALSPAC maternal blood samples for the omega-3 fatty acids specifically DHA & EPA, mercury, and selenium to approximate in utero exposures on the offspring. NIH is providing the DHA & EPA analyses. CDC is providing the mercury, selenium and other selected metals analyses. ALSPAC is providing its massive data bases on the mothers and children and the blood samples. USM is providing coordination, logistical, and scientific support. NOAA, NIH, CDC, and ALSPAC are providing the statistical analyses.

Previous studies on the influence of mercury on neurological development were based on smaller numbers of mother-child pairs (900 and less) and were conducted prior to having the benefit of the recent findings on selenium and omega-3 fatty acids as confounders to their analyses. Therefore, the study will be considerably more powerful and designed to explicitly include these important confounders into the analyses in order to obtain a clearer picture of the real world co-influences of in utero mercury, selenium, and omega-3 fatty acid exposures on neurological development, behavioral tendencies, and academic performance. As mercury, selenium, and omega-3 fatty acids naturally occur in seafood, the results of the study should be useful in re-evaluating the current seafood consumption advice that was based on the previous mercury vs. neurological development analyses.

This study is scheduled to be completed in four years and should coincide with the completion of other NOAA studies & surveys related to the possible use of mercury/selenium ratios in seafood as a criteria for assessing seafood safety.