JOHNSON CENTER

Ted Lindsay Foundation Research Report 2015

The Ted Lindsay Foundation has been supporting autism research at The Johnson Center for Child Health and Development for almost a decade. During the last few years, this research has focused on the possible negative effects of pre- and post-natal mercury exposure on child development. Exposure to mercury and other environmental toxicants, such as lead and pesticides, has been shown to result in behavioral and cognitive impairments in young children. While mercury exposure primarily occurs from eating contaminated fish, mercury in the form of the preservative, thimerosal, was previously included in many pediatric vaccines leading to concerns about it's possible effects on the developing infant. Although there has been no research directly supporting a link between vaccines and autism, the safety of thimerosal-containing vaccines has not been adequately tested leading to concerns over the safety of vaccines by many parents and advocacy groups.

One area of our research is examining whether low-level mercury exposure from thimerosal-containing vaccines affects infant development, cognition and behavior in a non-human primate model. In 2008, we initiated a five-year comprehensive primate study at the University of Washington Infant Primate Research Laboratory. We partnered with a number of experts in the fields of neuroimaging, behavior, immunology and neuropathology, from some of the best US academic institutions, providing a framework for collaborative research and data sharing to accelerate progress. This large, multi-disciplinary study is examining the development, cognition and behavior of animals receiving different vaccines, as well as controls animals receiving saline placebo injections. Earlier this year we published the first paper from this study, which examined several measures of infant development, including assessments of early learning, memory, cognition, and social behavior in vaccinated and unvaccinated animals. The data did not provide any evidence of abnormal development in infant primates receiving thimerosal-containing vaccines, which is reassuring.

We have recently completed an analysis of cellular pathology in specific brain regions that have previously been shown to be affected in autism. These include the frontal lobe (the part of the brain involved in motor control, some cognitive functions such as attention and language, and in regulating fear and pleasure responses), the cerebellum (which helps coordinate motor skills and executive function), the hippocampus (which is responsible for memory and spatial navigation), and the amygdala (which has a role in social interaction and controlling anxiety). These analyses were performed in collaboration with researchers at the University of Texas-Southwestern, and showed that low-level mercury exposure from thimerosal-containing pediatric vaccines did not result in an altered cellular pathology in this animal model.

In 2014 the Ted Lindsay Foundation provided funding for a clinical pilot study aimed at identifying biomarkers in blood samples from children with autism using a novel method of analyte profiling. Multi-Analyte Profiling (MAP) analysis enables us to screen for hundreds of altered analytes in a small blood sample and may be useful diagnostically or for targeting therapeutic interventions in autism. Our preliminary data on a small subset of samples has identified several proteins in blood samples that are differently expressed in samples from boys with and without autism. A paper summarizing these findings has been submitted for publication.

In 2015, we received additional funding from The Ted Lindsay Foundation to expand and validate the pilot study. We are now working on collecting additional blood samples from boys with and without autism, as well as samples from girls as there appear to be gender-specific differences in biomarkers for autism. In addition, we are examining biomarkers in blood samples from unaffected siblings of children with autism as preliminary data from our work, and that of other researchers, has shown that biomarker profiles of unaffected siblings may be closer to their sibling with autism, rather than to control children. This suggests both a strong environmental and genetic component to autism. Based on this work, our goal is to develop an autism-specific biomarker panel that may help differentiate blood samples from children with and without autism. Identification of a panel of biomarkers that are common to children with autism may lead to the development of a novel diagnostic assay to assist in early identification. We feel strongly that this approach will provide great insight into the molecular mechanisms involved in both the etiology and development of autism, allowing us to also develop possible targets for therapeutic intervention.

I would like to extend our sincere thanks for the continued support of the Ted Lindsay Foundation, and to all of you who have contributed to our research over the years. Your contributions are making meaningful differences in the autism community and will continue to do so for years to come.

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