JOHNSON CENTER

Ted Lindsay Foundation Research Report 2014

Over the last few years, the Ted Lindsay Foundation has been supporting autism research at The Johnson Center for Child Health and Development to examine the effects of low-level, 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 have 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. Since the study is performed blinded (meaning that researchers collecting data and samples do not know what study group animals are assigned to), we were unable to begin analyzing data until the beginning of this year. We are now in the process of examining neurobehavioral data including early infant development, memory and cognition, discrimination learning, and the development of social behavior.

We have also working on examining specific areas of the brain that have been shown to be associated with 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 amgdaya (which has a role in social interaction and controlling anxiety). Neuropathological analyses are underway in collaboration with researchers at the University of Texas-Southwestern.

The Ted Lindsay Foundation are also providing support for a pilot clinical 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 analytes that are differently expressed in samples from boys with and without autism. These include inflammatory markers, as well as certain proteins involved in other conditions, such as Alzheimer's Disease, which suggests that these may be elevated in children with autism. Based on this data, we are currently working on validating the pilot study by including a larger number of blood samples from boys with and without autism, as well as including 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. 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, suggesting both a strong environmental and genetic component to autism. Our goal is develop an autism-specific biomarker panel based on these analyses 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.

Laura Hewitson, PhD
Director of Research
The Johnson Center for Child Health and Development
Austin, TX