



The Ted Lindsay Foundation Research Report 2020

We are very grateful to the Ted Lindsay Foundation for their continued support of our autism research program. Autism, also known as Autism Spectrum Disorder (ASD), is a neurodevelopmental disorder characterized by challenges in social interaction and communication, and restricted and repetitive patterns of behavior. According to the Center for Disease Control's monitoring network, ASD affects approximately 1 in 54 children in the U.S. Far more boys are diagnosed with ASD than girls (1 in 34 boys versus 1 in 144 girls). All ethnic and socioeconomic groups are affected by ASD. There is no medical test or cure for the disorder. The exact cause of ASD is unknown, though many risk factors have been identified. A number of other conditions can occur alongside ASD presenting additional difficulties to children and families. These include anxiety, depression, epilepsy, attention deficit hyperactivity disorder (ADHD), intellectual disability, sleep issues, gastrointestinal impairments, and immune dysfunction. Understanding the causes of this disorder, and how to implement the very best treatments and interventions, remains an important goal for clinicians and researchers. Many families struggle to get a diagnosis for their child due to poor access to assessment providers, the cost and financing of assessments, and for some parents, a perceived stigma of having a child with special needs. One thing is clear though, the earlier a diagnosis is made – the earlier interventions can begin.

Earlier this year, our research team completed a study using a novel method for identifying ASD using biomarkers in blood samples. A blood biomarker is a substance that can be reliably measured (a gene, protein, metabolite) that is associated with a specific disease or condition, in this case, ASD. While some diseases already have reliable blood biomarkers, there are no reliable blood biomarkers for ASD currently available. With grant support from the Ted Lindsay Foundation, we completed our largest proteomics study to date, screening over 1300 potential protein biomarkers in 200 children with and without ASD. From this study, we have identified a panel of 9 proteins that were not only found to be associated with ASD, but levels also correlated with ASD severity, as measured by standardized diagnostic assessments. This panel of 9 ASD biomarkers was able to accurately diagnose ASD in 86% of cases. This study was published in *Scientific Reports* and is among several recent and ongoing research efforts to improve early diagnosis of ASD by shifting the focus to biological measurements instead of behavioral symptoms.

Since ASD is a very heterogeneous disorder, identifying potential biomarkers for even a subgroup of children with ASD, would be very helpful for early diagnosis, as well as for the development of therapeutic interventions. This approach would provide an additional tool to ascertain ASD risk, potentially in very young children, before behavioral

testing would be feasible. As our knowledge of these risk factors grows, so do the opportunities for promoting healthy pregnancies and better outcomes for children at high risk for ASD. When we are able to safely resume our biomarker research, we will continue the *validation* phase of this work, which includes screening blood samples from additional groups of children, with and without ASD, for the identified panel of 9 protein biomarkers to confirm that these markers are indeed specific to ASD. This approach will not only provide important insight into the molecular mechanisms involved in the etiology of ASD, but also allow us potentially develop targeted treatments for the core symptoms – an exciting prospect.

When the pandemic started and we were no longer able to conduct face-to-face research, we looked for other ways to support families. We conducted an online, questionnaire-based research study to examine the psychosocial and behavioral impact of COVID-19 on children with ASD and their families. Since many children with ASD lost their educational, therapeutic, and even clinical support, a large number of parents described worsening behaviors during the lockdown. Many parents also reported that their child experienced an increase in anxiety and depression resulting in an upsurge in the use of psychotropic medications. The data obtained from this study will be used to inform educational, behavioral, and mental health professionals to determine how to better support families with a child with ASD during this extremely challenging time. It is clear that collaborations with clinicians, researchers and people with ASD and their families will help us develop ways to improve the everyday lives of impacted families.

Despite these challenges, we are optimistic that the outlook for families in the ASD community will continue to improve over the coming year. While people with ASD face uncertain difficulties that make various aspects of life more challenging, a greater knowledge about the disorder is paving the way to better therapies, especially on the heels of the pandemic. ASD research is enabling more effective diagnostic processes, as well as enhanced treatments and a better understanding of necessary accommodations for those with the disorder. Effective interventions, therapies, and health care services will greatly improve the quality of life for those with ASD.

I would like to extend our sincerest thanks to the Ted Lindsay Foundation for their continued support of our research. While Mr. Lindsay is no longer with us, his drive and motivation for getting things done will continue to impact those of us in the autism community, whether we are parents, researchers, therapists, or caregivers. Together we can make a difference in the lives of families living with autism.



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