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## The Ted Lindsay Foundation Research Report 2022

Autism spectrum disorder (ASD) is quickly becoming the most significant neurodevelopmental disorder of our time. With an estimated 2% of US children affected by ASD, it is increasingly important to ensure an early diagnosis to help families obtain the best interventions for their child. ASD is a complex spectrum of symptoms with many associated conditions, including anxiety, depression, epilepsy, attention deficit hyperactivity disorder (ADHD), intellectual disability, sleep issues, gastrointestinal impairments, and immune dysfunction. We are so incredibly grateful to the late Mr. Lindsay, his family, and everyone at The Ted Lindsay Foundation for being champions in the autism community and for their continued support of our research program.

Originally thought to be a behavioral disorder, ASD has now been associated with many biological, physiological, and medical abnormalities. With the continued support from the Ted Lindsay Foundation, our greatest hope is that our research will result in the development of an objective 'measurement' to assist with the early diagnosis and/or management of ASD. Understanding the causes of this disorder and how to implement the 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.

With grant support from the Ted Lindsay Foundation, we completed our largest biomarker study to date, screening over 1300 potential protein biomarkers in 200 children with and without ASD. 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. From this study, we identified a panel of 9 proteins that were not only found to be associated with ASD, but the levels of these proteins also correlated with the severity of symptoms of ASD, as measured by the standardized behavioral 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 the 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 young children, before behavioral testing would be feasible.

As our knowledge of autism risk factors continues to grow, so do the opportunities for promoting healthy pregnancies and better outcomes for children at high risk for ASD. Earlier this year, we began the *validation* phase of this work. Validation is the process of assessing the identified biomarker panel for performance characteristics to ensure it is specific to ASD and then determining the range of conditions under which the biomarker panel will give reproducible and accurate data.



This approach will provide important insight into the molecular mechanisms involved in the etiology of ASD, and allow us to potentially develop targeted interventions for the core symptoms – an exciting prospect.

When we began this research partnership with the Ted Lindsay Foundation almost 15 years ago, we had no idea that in 2022 more than 2% of US children would be living with ASD. Now, with an estimated 70,000 adolescents with ASD becoming adults each year, it is more important than ever to provide effective interventions, health care services, and other supports to help them navigate the challenges they may face. It is part of our mission to ensure that all people with ASD have the opportunity to live a more independent life that is meaningful to the individual, along with access to effective interventions, services, and supports throughout their lifetime. Thanks to the generous support of the Ted Lindsay Foundation, we will continue to work towards this goal.

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

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