JOHNSON CENTER

The Ted Lindsay Foundation Research Report 2017

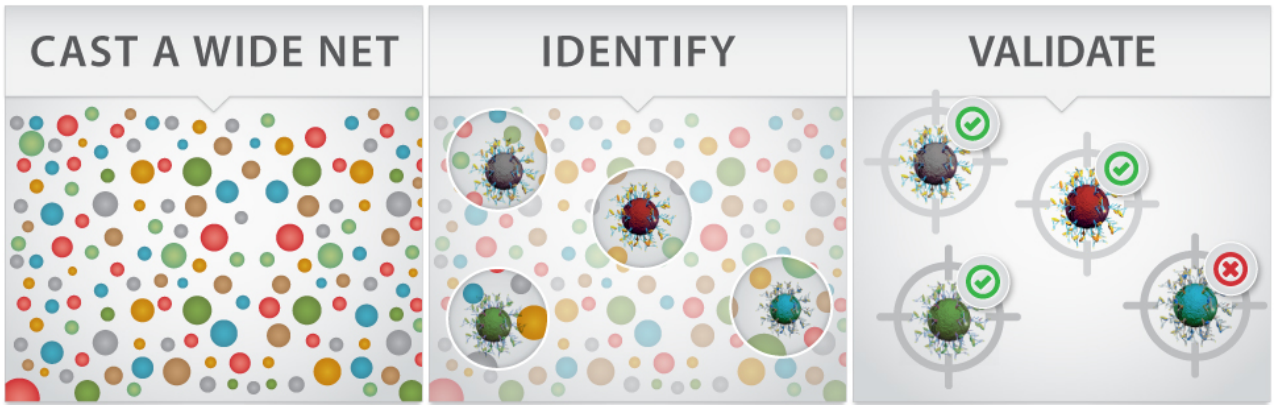
We are so incredibly grateful to Mr. Lindsay and everyone at The Ted Lindsay Foundation for their continued support of our research program over the last decade. With the prevalence of Autism Spectrum Disorder (ASD) increasing each year, understanding the causes of this disorder, and how to implement the very best treatments and interventions, have never been more important.

ASD is a neurodevelopmental disorder characterized by challenges in social interaction and communication, and restricted and repetitive patterns of behavior. ASD affects approximately 1 in every 68 children (1 in 42 boys) in the U.S. Most cases are not diagnosed until about age 4, when problems with communication and social interaction become apparent. Over the past year, our research team has been tackling the issue of how early ASD can be detected? It's a critical question, since early intervention has been shown to help limit the effects of autism. To try to answer this question, we have been working on identifying a potential *blood biomarker* for ASD. A blood biomarker is a substance that can be reliably measured in the blood (a gene, protein, metabolite etc.) that is associated with a specific disease or condition, in this case, ASD. While some diseases already have reliable blood biomarkers, for example, PSA for prostate cancer, there are no reliable blood biomarkers for ASD that are currently used clinically.

With grant support from the Ted Lindsay Foundation, our research has demonstrated that the levels of two specific proteins measured in blood samples from young boys with ASD could accurately diagnose ASD in 82 percent of cases. The study, published this year in the Journal of Neuroinflammation, is among several recent and ongoing efforts to improve early diagnosis of ASD by shifting 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 not only for early diagnosis but also for the development of therapeutics. This approach would provide an additional tool to ascertain ASD risk, potentially in very young children, before behavioral testing would be feasible.

The results from this study also suggest that inflammation, occurring either prenatally or during infancy, may be a risk factor for ASD. This has also been reported by other research, which has suggested that certain factors such as maternal infection and other factors during pregnancy may influence an infant's immune system and contribute to ASD risk. 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.

The next stage in this research is to validate the two potential ASD biomarkers in a new group of blood samples from different children. This will ensure that the biomarkers are truly specific to ASD. We will try to increase the number of proteins we are using to screen blood samples (currently we have tested two but have several other good candidates to screen), which may provide even greater sensitivity and specificity in our assays. We also hope to expand our research to include more girls with ASD. This can be challenging, as there are approximately 4 times as many boys than girls diagnosed with ASD making it harder to recruit enough females for our studies.



Finally, we would like to screen blood samples from newborns to determine their ASD risk based on our biomarker panel, and then follow them for several years monitoring their development. This would be a longitudinal study taking many years but it would allow us to see if these putative biomarkers are successful in predicting ASD. Identification of a panel of biomarkers that are common to children with ASD may lead to the development of a novel diagnostic assay based on a blood screening assay to assist in earlier autism screening and identification. We feel strongly that this research will provide important insight into the molecular mechanisms involved in both the etiology of autism, allowing us to also develop possible targets for the development of therapeutics.

I would like to extend our sincerest thanks to the Ted Lindsay Foundation for their continued support, and to all of you who have contributed to our research over the years. Together we are moving autism research forward, and making meaningful differences in the autism community.

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