

Title: Trust the Gut: Developing a Simple Fecal Test to Screen Infants at Risk for Autism

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Abstract

Autism spectrum disorder (ASD) is a difference in brain development that often leads to social and cognitive difficulties. Scientists have identified several hundred genes that contribute to ASD. Infants who have an older sibling with ASD are almost 10 times more likely to develop ASD than other infants. Therefore, researchers often use an infant sibling design to find early precursors to ASD. However, genes only account for 10–20% of ASD cases (Duffney et al., 2018; Geschwind, 2011), so environmental factors must also play a role. Alterations to the microbes that live in the human gut interact with the brain and offer a possible environmental factor. Bacterial products include neuropeptides that enter the bloodstream (similar to steroid hormones). Neuropeptides act in the brain and impact social and cognitive information processing to influence the development of social understanding. In addition, gut mucosal cells produce neurotransmitters and their precursors. These neurotransmitters influence social cognition and may shape the development of ASD. To progress towards a screening tool to aid in early identification of ASD, we would like to run a “proof of concept” study to investigate how the microbiome-gut-brain axis impacts toddler social development as it relates to ASD. Our study will describe the microbiota of higher-likelihood ASD infants relative to controls and then collect follow-up data by assessing ASD symptoms when participants are toddlers. We aim to eventually develop a simple fecal sample test that can be used at a well-baby checkup to determine which infants need further assessment for ASD.