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Latest research hints at predicting autism risk for pregnant mothers

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Researchers at Rensselaer Polytechnic Institute—led by Juergen Hahn, professor and head of biomedical engineering—are continuing to make remarkable progress with their research focused on autism spectrum

disorder (ASD). A recent paper authored by Hahn and Jill James from the University of Arkansas for Medical Sciences (UAMS) in the journal *Research in Autism Spectrum Disorders* discusses their work on predicting with approximately 90 percent accuracy whether a pregnant mother has a 1.7 percent or a tenfold increased risk of having a child diagnosed with ASD.

Currently there is no test for pregnant mothers that can predict the probability of having a child that will be diagnosed with ASD. Recent estimates indicate that if a mother has previously had a child with ASD, the risk of having a second child with ASD is approximately 18.7 percent, whereas the risk of ASD in the general population is approximately 1.7 percent.

"However," said Hahn, a member of the Rensselaer Center for Biotechnology and Interdisciplinary Studies, "it would be highly desirable if a prediction based upon physiological measurements could be made to determine which risk group a prospective mother falls into."

Hahn's work in developing a physiological test to predict autism risk is part larger emphasis on Alzheimer's and neurodegenerative diseases at the Center for Biotechnology and Interdisciplinary Studies, and an example of how the interdisciplinary life science and engineering interface at Rensselaer offers new perspectives and solutions for improving human health.

In this study, metabolites of the folate-dependent transmethylation and transsulfuration biochemical pathways of pregnant mothers were measured to determine whether or not the risk of having a child with autism could be predicted by her metabolic profile. Pregnant mothers who have had a child with autism before were separated into two groups based on the diagnosis of their child whether the child had autism or not. Then these mothers were compared to a group of control mothers who

have not had a child with autism before.

The researchers concluded that while it is not possible to determine during a pregnancy if a child will be diagnosed with ASD by age 3, they did find that differences in the plasma metabolites are indicative of the relative risk (18.7 percent vs 1.7 percent) for having a child with ASD.

"These are exciting results as they hint at differences in some metabolic processes that potentially play a role in increasing the risk of having a child with ASD," said Hahn.

In addition to the lead authors, Juergen Hahn of Rensselaer and Jill James of UAMS, this work included collaborators from Rensselaer, the University of Arkansas for Medical Sciences, and the MIND Institute at UC Davis.

This new research follows an earlier study published in 2017, which developed an algorithm based on levels of metabolites found in a blood sample that can accurately predict whether a child is on the autism spectrum. A follow-up study this spring was also highly promising in assessing whether a child is on the autism spectrum. These results have the potential for earlier diagnosis for ASD, and efforts are underway to develop a commercially available test based upon these findings.

More information: Kathryn Hollowood et al, Maternal metabolic profile predicts high or low risk of an autism pregnancy outcome, *Research in Autism Spectrum Disorders* (2018). DOI: 10.1016/j.rasd.2018.09.003

Provided by Rensselaer Polytechnic Institute

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