Mother’s immune system and autism risk

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Maternal antibodies that target fetal brain tissue during pregnancy could play a role in the development of some cases of autism spectrum disorder (ASD), according to two related studies published online this week in Translational Psychiatry. These results suggest that antibody profiles of mothers could serve as a biomarker for some forms of ASD risk, which could lead to steps to reduce the risk, or early diagnosis and early behavioral intervention.

ASD affects over 1% of children in the United States, however the underlying causes and neurodevelopmental progression of ASD are not well understood. Previous work has shown that fetal-maternal environment may be important in the development of some forms of ASD. Specifically, during fetal gestation some maternal antibodies can cross the placenta and react to fetal brain proteins.

Judy Van de Water and colleagues identify seven primary antigens that are targeted by ASD-associated maternal antibodies, each of which is expressed at significant levels in the human fetal brain and has an established role in neurodevelopment. Specific antigen combinations were present in 23% of mothers of ASD children and less than 1% of control mothers who did not have ASD children. Behaviorally, the authors found that ASD children from mothers who
express a subset of the antigens identified had increased overall impairment, compared to ASD children from mothers lacking these antibodies.

In a second study, Melissa Bauman and colleagues looked at the offspring of eight rhesus monkey mothers who during pregnancy were exposed to human antibodies from mothers of children with ASD; the antibodies from these mothers had been found to be reactive to specific fetal brain proteins. The authors found that the rhesus offspring displayed several behavioral differences, including inappropriate approaches to unfamiliar peers, which did not lead to sustained social interaction, like playing or grooming. Additionally, male offspring had enlarged brain volumes, most notably in the frontal lobe, consistent with some human neuroimaging reports of children with autism, including one study in which the mothers have these same antibodies. The authors caution that the interpretation of these findings is limited by a small sample size, characteristic of nonhuman primate research.

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