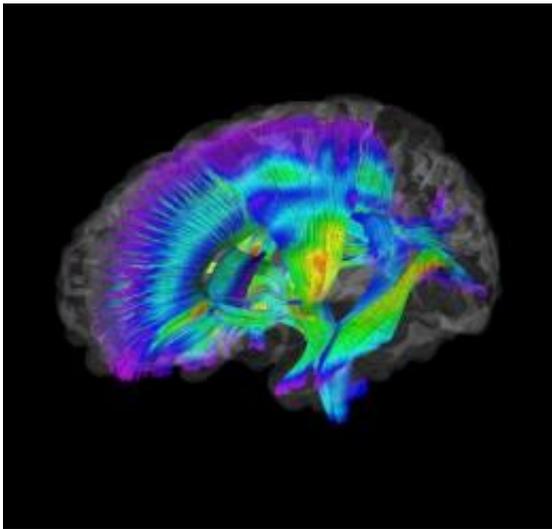


# Brain-imaging differences evident at 6 months in infants who develop autism

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This is an image of white matter pathways extracted from diffusion tensor imaging data for infants at-risk for autism. Warmer colors represent higher fractional anisotropy. Credit: Image created by Jason Wolff, Ph.D.

A new study led by the University of North Carolina at Chapel Hill found significant differences in brain development starting at age 6 months in high-risk infants who later develop autism, compared to high-risk infants who did not develop autism.

"It's a promising finding," said Jason J. Wolff, PhD, lead author of the study and a postdoctoral fellow at UNC's Carolina Institute for Developmental Disabilities (CIDD). "At this point, it's a preliminary

albeit great first step towards thinking about developing a biomarker for risk in advance of our current ability to diagnose autism."

The study also suggests, Wolff said, that autism does not appear suddenly in young children, but instead develops over time during infancy. This raises the possibility "that we may be able to interrupt that process with targeted intervention," he said.

Joseph Piven, MD, director of the CIDD, is senior author of the study.

The study was published online on Friday, Feb. 17 at AJP in Advance, a section of the website of the *American Journal of Psychiatry*. Its results are the latest from the ongoing Infant Brain Imaging Study (IBIS) Network, which is funded by the National Institutes of Health and headquartered at UNC. Piven received an NIH Autism Centers of Excellence (ACE) program network award for the IBIS Network in 2007. ACE networks consist of researchers at many facilities in locations throughout the country, all of whom work together on a single research question.

Participants in the study were 92 infants who all have older siblings with autism and thus are considered to be at high risk for autism themselves. All had diffusion tensor imaging – which is a type of magnetic resonance imaging (MRI) – at 6 months and behavioral assessments at 24 months. Most also had additional brain imaging scans at either or both 12 and 24 months.

At 24 months, 28 infants (30 percent) met criteria for autism spectrum disorders while 64 infants (70 percent) did not. The two groups differed in white matter fiber tract development – pathways that connect brain regions – as measured by fractional anisotropy (FA). FA measures white matter organization and development, based on the movement of water molecules through brain tissue.

This study examined 15 separate fiber tracts, and found significant differences in FA trajectories in 12 of the 15 tracts between infants who did develop autism versus infants who did not. Infants who later developed autism had elevated FA at six months but then experienced slower change over time. By 24 months of age, infants with autism had lower FA values than infants without autism.

"This evidence, which implicates multiple fiber pathways, suggests that autism is a whole-brain phenomenon not isolated to any particular brain region," Wolff said.

Provided by University of North Carolina School of Medicine

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