REPORTS | AUTISM

Functional neuroimaging of high-risk 6-month-old infants predicts a diagnosis of autism at 24 months of age

Robert W. Emerson[1,*], Chloe Adams[2,†], Tomoyuki Nishino[2,†], Heather Cody Hazlett[1,3], Jason J. Wolff[4], Lonnie Zwaigenbaum[5], John N...
+ See all authors and affiliations

Science Translational Medicine 07 Jun 2017:
Vol. 9, Issue 393, eaag2882
DOI: 10.1126/scitranslmed.aag2882

Peer Reviewed
<- see details

Article | Figures & Data | Info & Metrics | eLetters | PDF

You are currently viewing the abstract. View Full Text ▶

Predicting the future with brain imaging

In a new study, Emerson *et al.* show that brain function in infancy can be used to accurately predict which high-risk infants will later receive an autism diagnosis. Using machine learning techniques that identify patterns in the brain's functional connections, Emerson and colleagues were able to predict with greater than 96% accuracy whether a 6-month-old infant would develop autism at 24 months of age. These findings must be replicated, but they represent an important step toward the early identification of individuals with autism before its characteristic symptoms develop.

Abstract

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by social deficits and repetitive behaviors that typically emerge by 24 months of age. To develop effective early interventions that can potentially ameliorate the defining deficits of ASD and improve long-term outcomes, early detection is essential. Using prospective neuroimaging of 59 6-month-old infants with a high familial risk for ASD, we show that functional connectivity magnetic resonance imaging correctly identified which individual children would receive a research clinical best-estimate diagnosis of ASD at 24 months of age. Functional brain connections were defined in 6-month-old infants that correlated with 24-month scores on measures of social behavior, language, motor development, and repetitive behavior, which are all features common to the diagnosis of ASD. A fully cross-validated machine learning algorithm applied at age 6 months had a positive predictive value of 100% [95% confidence interval (CI), 62.9 to 100], correctly predicting 9 of 11 infants who received a diagnosis of ASD at 24 months (sensitivity, 81.8%; 95% CI, 47.8 to 96.8). All 48 6-month-old infants who were not diagnosed with ASD were correctly classified [specificity, 100% (95% CI, 90.8 to 100); negative predictive value, 96.0% (95% CI, 85.1 to 99.3)]. These findings have clinical implications for early risk assessment and the feasibility of developing early preventative interventions for ASD.

View Full Text

Science Translational Medicine
Vol 9, Issue 393
07 June 2017
Table of Contents

ARTICLE TOOLS
Email
Print
Alerts
Citation tools
Download Powerpoint
Save to my folders
Request Permissions
Share

RELATED CONTENT
NEWS
AI in Action: Combing the genome for the roots of autism

SIMILAR ARTICLES IN:
- PubMed
- Google Scholar