MedicalXpress

Discovering age-specific brain changes in autism

March 26 2015

The field of autism research has tried to find a central theory underlying brain changes associated with autism spectrum disorder (ASD). Now, a new study shows that individuals with the disorder exhibit different patterns of brain connectivity, when compared to typically developing (TD) individuals and that these patterns adjust as the individual ages.

"Our findings suggest that developmental stage must be taken into account to accurately build models that show how the brains of individuals with autism differ from neurotypical individuals," said Lucina Uddin, assistant professor of Psychology at the University of Miami (UM) College of Arts and Sciences and corresponding author of the study. "We believe that taking a developmental approach to examining brain connectivity in autism is critical for predicting response to treatment in young children with ASD."

Our brain is composed of more than one trillion cells called neurons. They interact with one another to form complex signaling networks. Previous studies have identified patterns of both functional hypo- and hyper-connectivity of these signaling networks in individuals with ASD. The current study, titled "Developmental Changes in Large-Scale Network Connectivity in Autism," attempts to explain these conflicting results, by indicating that the developmental stage of the individual plays a key role in the findings. The study is published in the journal *NeuroImage Clinical*.

Key findings of the study include:

- Children (7 to 11) with ASD, exhibit hyper-connectivity within large-scale brain networks, as well as decreased between-network connectivity, when compared to TD children.
- Adolescents (age 11 to 18) with ASD do not differ in within network connectivity, but have a decrease in between network connectivity, from TD adolescents.
- Adults (older than 18) with ASD show neither within, or between-network differences in functional connectivity compared with typical adults.

The findings suggest that alterations in the networks of the brain's cortex may trigger the complex behavioral characteristics observed in individuals with ASD.

"This study helps us understand the functional organization of brain networks and how they change across the lifespan in autism," said Jason S. Nomi, postdoctoral fellow in the Department of Psychology at UM and lead author of the study.

The researchers are currently working to explicitly characterize an important developmental transition in individuals with autism: the onset of puberty.

More information: *NeuroImage Clinical*, www.sciencedirect.com/science/ … ii/S2213158215000431

Provided by University of Miami