Uploaded to the VFC Website

▶▶ *2021* ◀◀

Riverside County, California

CAMH study reveals novel insights into brain networks in people with autism

May 14 2018

A CAMH study analyzing more than 1,000 brain scans reveals surprising new insights into brain networks in people with autism, after applying a new personalized approach to brain mapping.

Autism is a complex, lifelong neurodevelopmental disorder that affects more than one in 100 people - so understanding these brain networks has potential to show how autism develops over time, and to identify new approaches to treatment.

"We know that autism is different across children, who don't show the exact same impairments," says Dr. Erin Dickie, a CAMH scientist in the Kimel Family Imaging-Genetics Translational Laboratory, and lead author of the study. "One explanation is that each may have slight differences in brain network functioning, despite having a common diagnosis."

Among researchers, clinicians and families, there is also increasing awareness that there are probably different sub-types of autism, based on differences in brain biology, says co-author Dr. Stephanie Ameis, Clinician Scientist and autism expert in the Child, Youth and Emerging Adult Division and the Campbell Family Mental Health Research Institute at CAMH.

The new CAMH-developed approach, published in *Biological Psychiatry*, provides a way to examine the location of individual brain networks with more precision. A brain network connects different brain regions, sending signals across pathways for specific functions, such as vision or attention. Each network is located in roughly the same region in everyone's brains.

The study confirmed that differences in the spatial layout of brain networks were more pronounced among people with autism than those without - in other words, the brains of two people with autism are different from each another, and this difference is larger than those measured in brains of two people without autism. In addition, the most variation in network location was found in the brain's attention networks.

"We developed a new way of looking at how the brain is organized," says Dr. Dickie. Using an approach called personalized intrinsic network topography (PINT), the team mapped the location of six brain networks by individual, to ensure more accuracy in showing where these networks exist, rather than relying on a template pointing to approximate locations. PINT was applied to functional MRI brain scans of people in "resting state," not completing any tasks in the scanner.

Scientists previously suspected that there was "dis-connectivity," or weaker long-range connections, between brain areas in those with autism. After personalized brain mapping was applied, this study showed that the evidence for dis-connectivity dropped. This suggests that brain networks related to attention in autism may not only be disconnected, but also displaced, says Dr. Dickie.

This new approach, which has been made publicly available, can now be used in studies of brain function in autism to account for network displacement.

"Recently, there have been high profile clinical trials for individuals with autism spectrum disorder, but these novel treatments have not shown any therapeutic effect," says Dr. Ameis. "Part of the problem may be the variability in autism. This study underscores the importance of accounting for individual differences to develop innovative and personalized treatment approaches."

The brain scans were accessed from the ABIDE network, (Autism Brain Imaging Data Exchange), enabling a large sample of 393 people with autism and 496 as a comparison group, ranging in age from eight to 55, as well as scans to test the reliability of the PINT approach.

Source:

https://www.camh.ca/