NEWS

Study tracks connectivity in autism mice as they grow up

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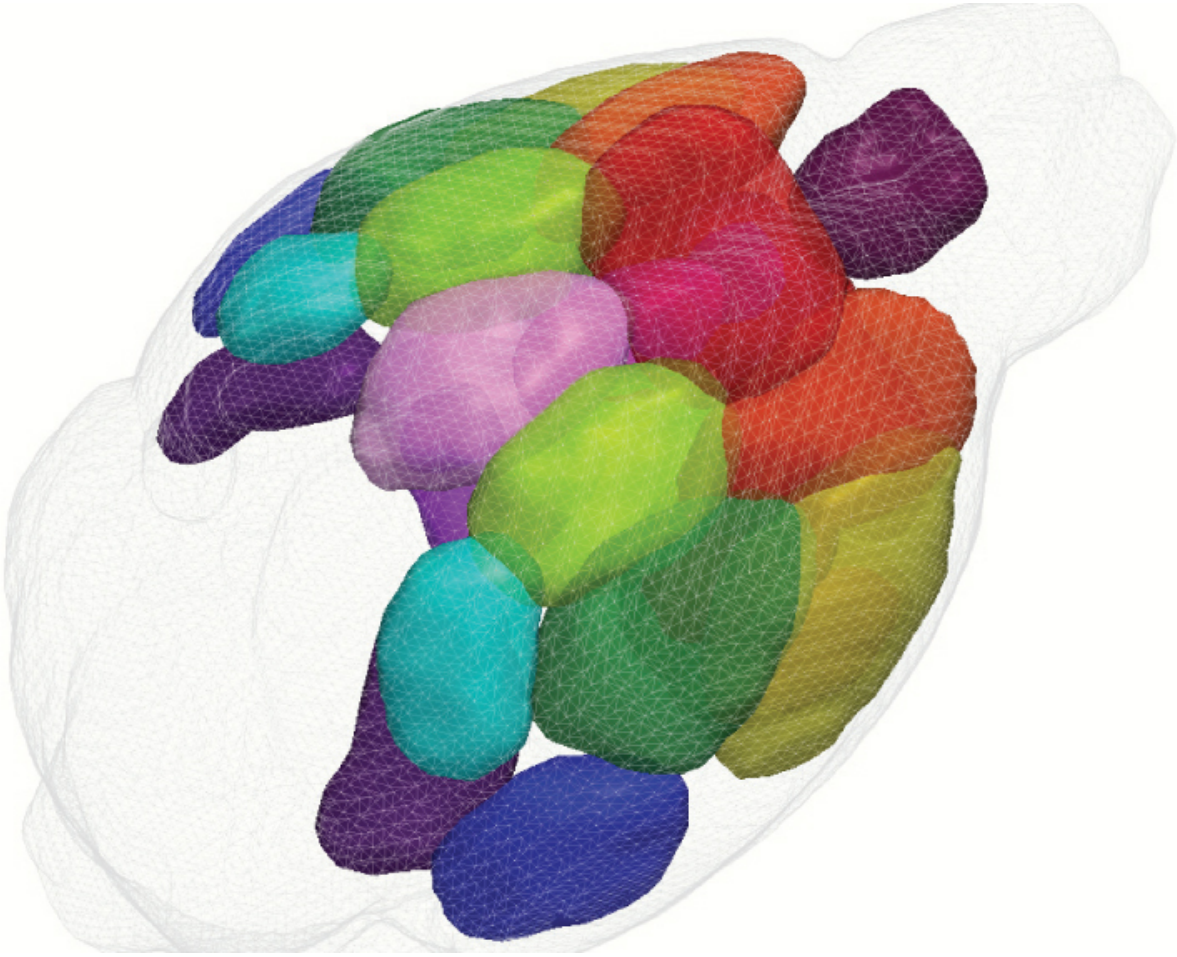

Two mouse models of autism have distinct patterns of brain '**connectivity**' that emerge at different times. The unpublished findings were presented yesterday at the **2016 Society for Neuroscience annual meeting** in San Diego.

Connectivity is a measure of the extent to which two regions of the brain become active or inactive together. The study is the first to track **connectivity in autism mouse models** as they grow up.

Researchers scanned the brains of two types of mutant mice. One lacks a working copy of **FMR1**, the gene that underlies the autism-linked condition **fragile X syndrome**. The other is missing **CNTNAP2**, a gene **associated with autism and language difficulties**.

The mice underwent magnetic resonance imaging (MRI) as 30-day-old juveniles, 60-day-old adolescents and as 110-day-old adults.

The scans are part of a larger effort to define a 'connectivity fingerprint' for each of 11 mouse models of autism, says **Valerio Zerbi**, a postdoctoral researcher in **Nicole Wenderoth**'s lab at ETH Zurich in Switzerland, who presented the work. The effort may also reveal similarities across the 11 models.

Mice lacking FMR1 show less connectivity than controls in areas related to sensory processing and integration. These differences are apparent from the time the mice are 30 days old.

Mice lacking CNTNAP2 exhibit over-connectivity in motor integration areas and under-connectivity in networks involving the hippocampus, **the brain's memory center**. But these differences don't emerge until adulthood.

Technical feat:

The researchers also examined the brain's white matter, the long nerve fibers that connect different regions. Compared with controls of the same age, both types of mutant mice have lower fractional anisotropy, a measure thought to reflect how well organized or developed white matter fibers are. Studies have also shown abnormal white-matter organization **and delayed maturation** in individuals with autism.

The new study represents an impressive technical feat, says Marie-Julie Allard, a graduate student in **Guillaume Sébire**'s lab at McGill University in Montreal, Canada, who was not involved in the work. "Those mice are very young," she says. **Imaging is challenging** in adult mice, let alone juvenile ones.

Researchers might ultimately use these connectivity patterns to evaluate drugs or other autism treatments in a more objective way than behavioral assays can, Zerbi says.

The patterns in mice could also help scientists understand connectivity in people with autism, which differs from that in controls. Mouse imaging data could help researchers identify the genes underlying those differences. "The strength is we can control the genetics, and we can try to link specific genetics with connectivity profiles," Zerbi says.

*For more reports from the 2016 Society for Neuroscience annual meeting, please **click here**.*