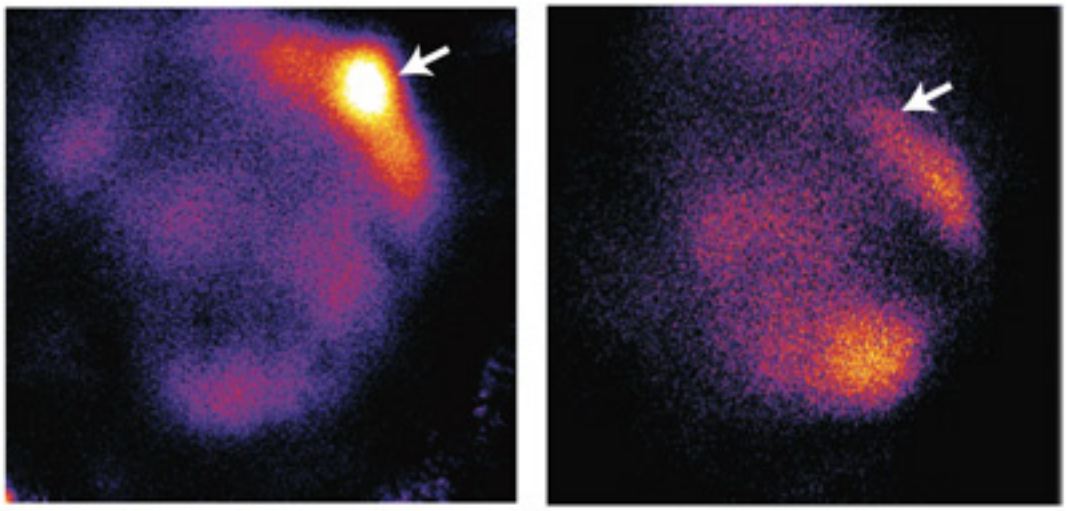
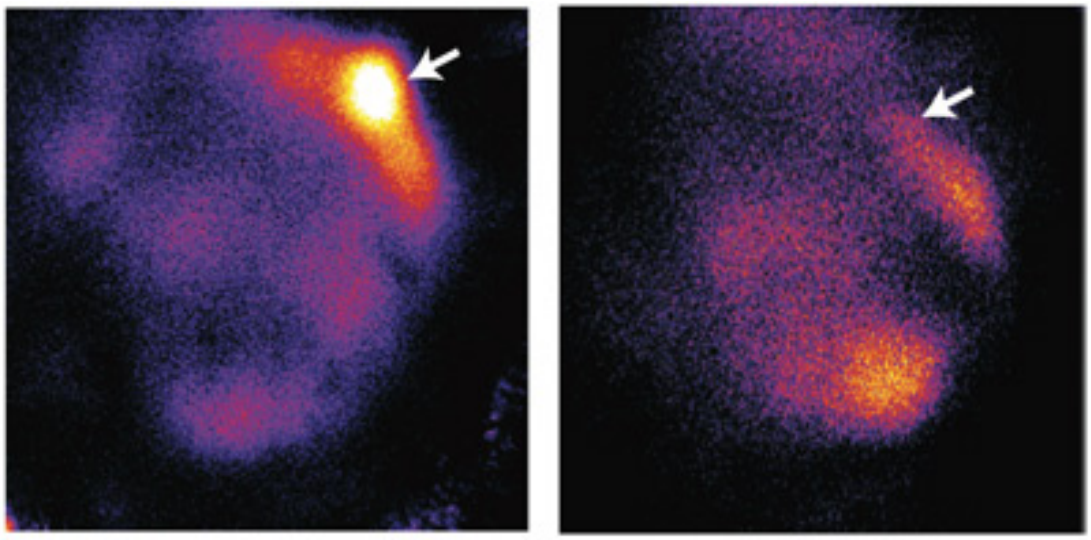
NEWS

Brains of Angelman mice show altered response to motion

BY **VIRGINIA HUGHES**

16 NOVEMBER 2014





Motion detectors: Compared with normal mice (left), mouse models of Angelman syndrome (right) do not show a burst of activity when watching moving bars change speed.

Mice modeling **Angelman syndrome**, an autism-related disorder, show abnormal brain responses when they see movement, according to unpublished work presented today at the **2014 Society for Neuroscience annual meeting** in Washington, D.C.

Angelman syndrome is a rare disorder characterized by developmental delay, seizures and a lack of speech. It is caused by mutations or deletions of the maternal copy of the **UBE3A** gene. Having extra copies of the same gene has been **tied to autism**.

Mice that lack the maternal copy of UBE3A show abnormalities at the **synapse**, or junction between neurons. They also **lack plasticity** — the ability to adapt to experience — in brain regions involved in sensory perception, such as vision.

Instead of focusing on individual cells, the new study investigated whether the mutant mice show distinct changes in brain circuits.

A reliable marker of abnormal circuits could be used to **screen drugs** for use in the clinic, says **Leah Townsend**, a graduate student in **Spencer Smith**'s lab at the University of North Carolina at Chapel Hill, who presented the findings. "It might pave the way to moving faster into human trials."

The researchers cut a window in the animals' skulls above the visual cortex. They then shone a beam of red light on the area and used a video camera to record how the light is reflected off the tissue.

Because oxygenation changes the color of blood, this so-called 'intrinsic signal optical imaging' indirectly measures brain activity — but unlike functional magnetic resonance imaging, it takes only six minutes. "You can look at the entire visual cortex of a mouse in a single experiment," Townsend says.

The researchers measured changes in brain activity while the animals watched vertical black bars moving from left to right at various speeds. When watching a visual stimulus change from a slow to a high speed, normal mice show a burst of activity in 'higher-order' visual areas, meaning those that process the visual information after it passes through other areas of cortex. By contrast, the Angelman mice show no such activation.

This difference occurs only after a certain age, however. Mice open their eyes at 14 days old. At 20 days of age, the researchers saw no differences in brain activity between Angelman mice and controls. By 85 days, the differences were stark. This age dependence is exciting, Townsend says. “It suggests that there might be a therapeutic intervention window.”

No one knows whether people with Angelman syndrome have problems with motion perception, Townsend notes. “It’d be hard to figure out how to do that, given that a lot of them are nonverbal.”

But there is intriguing research **linking autism to the visual system**. Some studies have suggested that young children with autism are particularly attracted to **synchronous sights and sounds**, for example. And a handful of studies have shown that people with the disorder have **trouble with processing movement**, particularly movement by living creatures, known as **biological motion**.

*For more reports from the 2014 Society for Neuroscience annual meeting, please **click here**.*