

NEWS

# Astrocytes may play starring role in learning

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Astrocytes, star-shaped brain cells that support neurons, may be needed for mice to learn motor skills, according to unpublished research presented Saturday at the **2012 Society for Neuroscience annual meeting** in New Orleans.

Astrocytes are the most abundant cells in the brain. They provide structure and nutrients to neurons and have long, thin tentacles squeezed between neuronal junctions. But **their role at these junctions, or synapses**, is still unclear.

Mouse studies have **implicated astrocytes** in the autism-related disorder Rett syndrome. This has changed the perception that only neurons are involved in neurological disorders.

Astrocytes are known to help synapses strengthen in response to experience. But the work presented at the conference is the first to show that they directly influence learning in mice, says lead researcher **Anna Dunaevsky**, associate professor of developmental neuroscience at the University of Nebraska.

In the study, the researchers trained mice to reach through a small hole and grab a food pellet. This is a tricky task, as the pellet can easily fall off the narrow platform. But as the mice practice, they get better and better at the task.

Mice can be left- or right-limbed, and learning strengthens connections in the forelimb motor cortex on the opposite side of the brain. After training, astrocytes are more active on this side of the brain than on the other, the study found.

Mice treated with a compound that inhibits the activity of astrocytes do not improve at retrieving the pellets. When the researchers treated these mice with D-serine, a chemical messenger released by active astrocytes, they began to improve at the task.

Mice not exposed to the astrocyte inhibitor also subtly improve in motor learning when treated with D-serine, suggesting that the chemical plays a role in enhancing motor skills. This suggests that D-serine could be a potential drug treatment for motor deficits, says Dunaevsky.

Dunaevsky's team has also found that mice that model **fragile X syndrome** struggle with motor learning and have trouble making appropriate connections at synapses. Her team aims to investigate whether this is linked to dysfunction in astrocytes.

*For more reports from the 2012 Society for Neuroscience annual meeting, please [click here](#).*