# Researchers discover modifications to myelin play vital role in learning

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Researchers from the University of Colorado Anschutz Medical Campus

have discovered a new way the brain processes and communicates information that could lead to improved learning in those suffering neurological disorders or recovering from brain injuries.

The study was published in *Nature Neuroscience*.

Researchers focused on changes in myelination, the process by which certain cells in the brain's central nervous system produce layers of myelin that wrap around neuronal axons. This helps the brain better deliver electrical information throughout the body. Healthy mice were taught to perform a simple task as researchers monitored their brains before, during and after learning.

"Our study provides new information about how the brain changes during the process of learning. The data suggests that anytime anyone learns how to ride a bike, throw a ball, or even learn a new dance move, these behaviors result in changes in the pattern of myelination on the neuronal circuits that are involved in these new motor tasks," said Ethan Hughes, Ph.D., assistant professor in the Department of Cell and Developmental Biology at the University of Colorado School of Medicine. "It was previously thought that learning did not impact pre-existing myelin. Our work argues that changes in mature myelin sheaths on specific neuronal circuits may play an important role in the ability for us to learn new motor tasks and master them."

Hughes found that gaps between myelin sheaths, called nodes of Ranvier, can lengthen during the learning process. The computational modeling done in collaboration with Alon Poleg-Polsky in the Department of Physiology and Biophysics at the University of Colorado School of Medicine suggests these changes could alter the speed and timing of neuronal communication in the brain. It also suggests that the better we learn these tasks, the greater the changes in myelination will be on the neuronal circuits involved in the task.

The research could eventually help doctors treat traumatic brain injury or a stroke. Hughes said it could also further treatment options for neurological disorders like multiple sclerosis.

"Medications, learning techniques and rehabilitation that stimulate myelination are beginning to be used to treat people who suffer from multiple sclerosis," said Hughes. "Our research suggests some of the same techniques could also be used to help people with other disorders or injuries regain motor functions they may have lost. It could potentially even help healthy people learn more efficiently."

**More information:** Clara M. Bacmeister et al, Motor learning drives dynamic patterns of intermittent myelination on learning-activated axons, *Nature Neuroscience* (2022). DOI: 10.1038/s41593-022-01169-4

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