

Neurologists identify potential biomarker of cognitive decline for earlier diagnosis of disease

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Researchers from the Department of Neurology at NYU Langone Medical Center identified for the first time that changes in the tissue located at the junction between the outer and inner layers of the brain, called "blurring", may be an important, non-invasive biomarker for earlier diagnosis and the development of new therapies for degenerative brain conditions, such as multiple sclerosis. The study was published in the Oct. 26th issue of the *Journal of Neuroscience*.

"The findings are significant because this is the first time we have mapped the distinct relationship between blurring of the boundary in the left hemisphere, where verbal language skills are managed, and the impact that changes in this area have on cognitive ability," said Karen Blackmon, PhD, research assistant professor, Department of Neurology and lead author of the study. "The fact that this occurs in healthy brains and appears to be connected with a person's cognitive function has significant implications for our ability to diagnose [brain disease](#) earlier and for the potential development of new therapies."

In the study, 32 healthy adults had an MRI scan of their brain. The images were enhanced to highlight the junction between the area of the brain where neurons control cognitive and motor function, or "grey matter", and the area where longer, myelin-insulated axon cells responsible for efficient transmission of [electrical signals](#), or "[white matter](#)", exist. When neurons develop incorrectly among the axons

(which can happen in-utero or after a [brain injury](#)) they are visible as "blurring" along the edge of this junction on an MRI. Blurring is associated with impaired cognitive conditions, such as epilepsy and Alzheimer's disease, but has never been identified in individuals without these conditions.

The researchers administered standardized [intelligence tests](#) and scored the participants verbal, visual, and spatial [cognitive abilities](#). These abilities are controlled by a distinct area in the brain's left hemisphere and are an established measure of overall cognitive function.

The researchers found that not only did blurring exist in brains without a degenerative condition, but when the verbal language assessment scores were linked with the MRI data, there was a strong relationship between the amount of blurring and a decreasing level of verbal language skill.

Provided by New York University School of Medicine

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