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Researchers link multiple sclerosis to different area of brain

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Radiology researchers at The University of Texas Health Science Center at Houston (UTHealth) have found evidence that multiple sclerosis affects an area of the brain that controls cognitive, sensory and motor functioning apart from the disabling damage caused by the disease's visible lesions.

The thalamus of the brain was selected as the benchmark for the study conducted by faculty at the UTHealth Medical School. Lead researchers include Khader M. Hasan, Ph.D., associate professor, and Ponnada A. Narayana, Ph.D., professor and director of Magnetic Resonance Imaging (MRI) in the Department of Diagnostic and Interventional Imaging; and Jerry S. Wolinsky, M.D., the Bartels Family and Opal C. Rankin Professor in the Department of Neurology.

Results of the research were published in a recent edition of *The* Journal of Neuroscience.

"The thalamus is a central area that relates to the rest of the brain and acts as the 'post office,' " said Hasan, first author of the paper. "It also is an area that has the least amount of damage from lesions in the brain but we see volume loss, so it appears other brain damage related to the disease is also occurring."

Researchers have known that the thalamus loses volume in size with typical aging, which accelerates after age 70. The UTHealth multidisciplinary team's purpose was to assess if there was more volume

loss in patients with multiple sclerosis, which could explain the dementia-related decline associated with the disease.

"Multiple sclerosis patients have cognitive deficits and the thalamus plays an important role in cognitive function. The lesions we can see but there is subclinical activity in multiple sclerosis where you can't see the changes," said senior author Narayana. "There are neurodegenerative changes even when the brain looks normal and we saw this damage early in the disease process."

For the study, researchers used precise imaging by the powerful 3 Tessla MRI scanner to compare the brains of 109 patients with the disease to 255 healthy subjects. The patients were recruited through the Multiple Sclerosis Research Group at UTHealth, directed by Wolinsky, and the healthy controls through the Department of Pediatrics' Children's Learning Institute.

Adjusting for age-related changes in the thalamus, the patients with multiple sclerosis had less thalamic volume than the controls. The amount of thalamic loss also appeared to be related to the severity of disability.

"This is looking at multiple sclerosis in a different way," Hasan said. "The thalami are losing cellular content and we can use this as a marker of what's going on. If we can find a way to detect the disease earlier in a more vulnerable population, we could begin treatment sooner."

Provided by University of Texas Health Science Center at Houston