

The hormone irisin is found to confer benefits of exercise on cognitive function

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The novel hormone irisin has the ability to drive the cognitive benefits of exercise, and therefore holds great promise for treating cognitive decline in Alzheimer's disease, scientists at Massachusetts General Hospital

(MGH) have found. In a study published in *Nature Metabolism*, the team reported that irisin, secreted by the muscles during exercise, could be an effective therapeutic for addressing deficits of the brain that result from Alzheimer's disease.

"Preserving cognitive function is a major challenge in an increasingly aging population," says Christiane Wrann, DVM, Ph.D., leader of the Program in Neuroprotection in Exercise at MGH and senior author of the study. "Exercise is known to have positive effects on [brain health](#), which is why identifying key mediators of those neuroprotective benefits, like irisin, has become such a critical goal of research."

Using mouse models, the team showed that genetic deletion of irisin impairs cognitive function in exercise, aging and Alzheimer's disease, which was in part caused by alterations of newborn neurons in the hippocampus. The hippocampus is the compartment of the brain that stores memories and is the first to show signs of Alzheimer's disease. At the same time, the MGH study found that elevating irisin levels in the bloodstream improved cognitive function and neuroinflammation in mouse models for Alzheimer's disease.

"What makes this study particularly strong is that we show irisin's effect on cognitive function in not one but four different mouse models," states Bruce Spiegelman of Dana-Farber Cancer Institute and Harvard Medical School, who discovered irisin in 2012 and is a co-author of the current paper. Researchers were further encouraged by the fact that irisin treatment was effective in Alzheimer's disease mouse models even after the development of significant pathology. "This could have implications for intervention in humans with Alzheimer's disease where therapy typically starts after patients have become symptomatic," Wrann says.

Another important finding of the study is that irisin protects against neuroinflammation by acting directly on glia cells in the brain. Co-author

Rudy Tanzi, co-director of the McCance Center for Brain Health at MGH, explains that "it's hard to imagine anything better for brain health than daily exercise, and our findings shed new light on the mechanism involved: protecting against neuroinflammation, perhaps the biggest killer of brain neurons as we age." Wrann adds that "since [irisin](#) does not specifically target [amyloid plaques](#), but rather neuroinflammation directly, we're optimistic it could have beneficial effects on neurodegenerative diseases beyond just Alzheimer's."

More information: Mohammad R. Islam et al, Exercise hormone irisin is a critical regulator of cognitive function, *Nature Metabolism* (2021). [DOI: 10.1038/s42255-021-00438-z](https://doi.org/10.1038/s42255-021-00438-z)

Provided by Massachusetts General Hospital

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