

Molecule produced during exercise boosts brain health

Date: October 10, 2013

Source: Cell Press

Research has shown that exercise is good for the brain. Now investigators have identified a molecule called irisin that is produced in the brain during endurance exercise and has neuroprotective effects. Researchers were able to artificially increase the levels of irisin in the blood to activate genes involved in learning and memory. The findings, published online October 10 in the Cell Press journal *Cell Metabolism*, may be useful for designing drugs that utilize this exercise-induced molecule to guard against neurodegenerative diseases and improve cognition in the aging population.

While it's known that exercise can boost cognitive function and lessen symptoms of neurological diseases like depression, stroke, and Alzheimer's disease, the mechanisms underlying these effects are unclear. One important player is thought to be a growth factor named brain-derived neurotrophic factor (BDNF).

Through experiments conducted in mice, investigators led by Dr. Bruce Spiegelman of the Dana-Farber Cancer Institute and Harvard Medical School found that a molecule called FNDC5 and its cleavage product, irisin, are elevated by endurance exercise in the brain and increase BDNF expression. On the other hand, mice genetically altered to have low irisin levels in the brain had reduced levels of BDNF.

The team also found that raising levels of irisin in the circulation caused the molecule to cross the blood brain barrier, where it increased expression of BDNF and activated genes involved in cognition.

"Our results indicate that FNDC5/irisin has the ability control a very important neuroprotective pathway in the brain," says Dr. Spiegelman. The researchers next plan to work on developing a stable form of the irisin protein that can be given to mice by injection and may augment the brain's natural anti-degeneration pathways.

Story Source:

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Journal Reference:

1. Wrann et al. **Exercise induces hippocampal BDNF through a PGC-1/FNDC5 pathway.** *Cell Metabolism*, October 2013

Cite This Page:

MLA **APA** **Chicago**

Cell Press. "Molecule produced during exercise boosts brain health." ScienceDaily. ScienceDaily, 10 October 2013. <www.sciencedaily.com/releases/2013/10/131010124555.htm>.