

Remember magnesium if you want to remember

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Those who live in industrialized countries have easy access to healthy food and nutritional supplements, but magnesium deficiencies are still common. That's a problem because new research from Tel Aviv University suggests that magnesium, a key nutrient for the functioning of memory, may be even more critical than previously thought for the neurons of children and healthy brain cells in adults.

Begun at MIT, the research started as a part of a post-doctoral project by Dr. Inna Slutsky of TAU's Sackler School of Medicine and evolved to become a multi-center experiment focused on a new magnesium supplement, magnesium-L-threonate (MgT), that effectively crosses the blood-brain barrier to inhibit calcium flux in brain neurons.

Published recently in the scientific journal *Neuron*, the new study found that the synthetic magnesium compound works on both young and aging animals to enhance memory or prevent its impairment. The research was carried out over a five-year period and has significant implications for the use of over-the-counter magnesium supplements.

In the study, two groups of rats ate normal diets containing a healthy amount of magnesium from natural sources. The first group was given a supplement of MgT, while the control group had only its regular diet. Behavioral tests showed that [cognitive functioning](#) improved in the rats in the first group and also demonstrated an increase of synapses in the brain -- connective nerve endings that carry memories in the form of electrical impulses from one part of the brain to the other.

Bad news for today's magnesium supplements

"We are really pleased with the positive results of our studies," says Dr. Slutsky. "But on the negative side, we've also been able to show that today's over-the-counter magnesium supplements don't really work. They do not get into the brain.

"We've developed a promising new compound which has now taken the first important step towards clinical trials by Prof. Guosong Liu, Director of the Center for Learning and Memory at Tsinghua University and cofounder of Magceutics company," she says.

While the effects were not immediate, the researchers in the study -- from Tel Aviv University, MIT, the University of Toronto, and Tsinghua University in Beijing -- were able to assess that the new compound shows improved permeability of the blood-brain barrier. After two weeks of oral administration of the compound in mice, magnesium levels in the cerebral-spinal fluid increased.

Toward a more "plastic" brain

"It seems counterintuitive to use magnesium for memory improvement because magnesium is a natural blocker of the NMDA receptor, a molecule critical for memory function. But our compound blocks the receptor only during background neuronal activity. As a result, it enhances the brain's 'plasticity' and increases the number of brain synapses that can be switched on," says Dr. Slutsky.

"Our results suggest that commercially available magnesium supplements are not effective in boosting magnesium in cerebro-spinal fluid," she says. "Magnesium is the fourth most abundant mineral in the body, but today half of all people in industrialized countries are living with

magnesium deficiencies that may generally impair human health, including cognitive functioning."

Before the new compound becomes commercially available, Dr. Slutsky advises people to get their [magnesium](#) the old-fashioned way -- by eating lots of green leaves, broccoli, almonds, cashews and fruit. The effects on memory won't appear overnight, she cautions, but with this persistent change in diet, [memory](#) should improve, and the effects of dementia and other cognitive impairment diseases related to aging may be considerably delayed.

Provided by Tel Aviv University

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