

Researchers discover that Klotho is neuroprotective against Alzheimer's disease

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Boston University School of Medicine researchers may have found a way to delay or even prevent Alzheimer's disease (AD). They discovered that pre-treatment of neurons with the anti-aging protein Klotho can prevent neuron death in the presence of the toxic amyloid protein and glutamate. These findings currently appear in the *Journal of Biological Chemistry*.

Alzheimer's disease is the most frequent age-related dementia affecting 5.4 million Americans including 13 percent of people age 65 and older and more than 40 percent of people over the age of 85. In AD the cognitive decline and dementia result from the death of nerve cells that are involved in learning and memory. The [amyloid protein](#) and the excess of the neurotransmitter, glutamate are partially responsible for the neuronal demise.

Nerve cells were grown in [petri dishes](#) and treated with or without Klotho for four hours. Amyloid or glutamate then were added to the dish for 24 hours. In the dishes where Klotho was added, a much higher percentage of [neurons](#) survived than in the dishes without Klotho.

"Finding a neuroprotective agent that will protect [nerve cells](#) from amyloid that accumulates as a function of age in the brain is novel and of major importance," explained corresponding author Carmela R. Abraham, PhD, professor of biochemistry and pharmacology at BUSM. "We now have evidence that if more Klotho is present in the brain, it will protect the neurons from the oxidative stress induced by amyloid and glutamate.

According to the researchers, Klotho is a large protein that cannot penetrate the [blood brain barrier](#) so it can't be administered by mouth or injection. However in a separate study the researchers have identified small molecules that can enter the brain and increase the levels of Klotho. "We believe that increasing Klotho levels

with such compounds would improve the outcome for Alzheimer's patients, and if started early enough would prevent further deterioration. This potential treatment has implications for other neurodegenerative diseases such as Parkinson's, Huntington's, ALS and brain trauma, as well," added Abraham.

Provided by Boston University Medical Center

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