

Feeding fruit flies with spermidin suppresses age-dependent memory impairment

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(Medical Xpress)—Age-induced memory impairment can be suppressed by administration of the natural substance spermidin. This was found in a recent study conducted by Prof. Dr. Stephan Sigrist from Freie Universität Berlin and the NeuroCure Cluster of Excellence and Prof. Dr. Frank Madeo from Karl-Franzens-Universität Graz. Both biologists, they were able to show that the endogenous substance spermidine triggers a cellular cleansing process, which is followed by an improvement in the memory performance of older fruit flies. At the molecular level, memory processes in animal organisms such as fruit flies and mice are similar to those in humans. The work by Sigrist and Madeo has potential for developing substances for treating age-related memory impairment. The study was first published in the online version of *Nature Neuroscience*.

Aggregated proteins are potential candidates for causing age-related dementia. With increasing age, the proteins accumulate in the brains of [fruit flies](#), mice, and humans. In 2009 Madeo's group in Graz already found that the spermidin molecule has an anti-aging effect by setting off autophagy, a cleaning process at the cellular level. Protein aggregates and other cellular waste are delivered to lysosomes, the digestive apparatus in cells, and degraded.

Feeding the fruit flies spermidin significantly reduced the amount of [protein aggregates](#) in their brains, and their memories improved to juvenile levels. This can be measured because flies can learn under classical Pavlovian conditioning and adjust their behavior accordingly.

In humans, memory capacity decreases beginning around the age of 50. This loss accelerates with increasing age. Due to increasing life expectancy, age-related [memory impairment](#) is

expected to increase drastically. The spermidine concentration increases with age in flies as in humans. If it were possible to delay the onset of age-related dementia by giving individuals spermidin as a food supplement, it would be a great breakthrough for individuals and for society. Patient studies are the next step for Sigrist and Madeo.

NeuroCure is a Cluster of Excellence in the neurosciences at Charité ? Universitätsmedizin Berlin working in collaboration with the departments of biology and biochemistry at Freie Universität Berlin and Humboldt-Universität zu Berlin as well as with three independent research institutions.

More information: Varun K Gupta, Lisa Scheunemann, Tobias Eisenberg, Sara Mertel, Anuradha Bhukel, Tom S Koemans, Jamie M Kramer, Karen S Y Liu, Sabrina Schroeder, Hendrik G Stunnenberg, Frank Sinner, Christoph Magnes, Thomas R Pieber, Shubham Dipt, André Fiala, Annette Schenck, Martin Schwaerzel, Frank Madeo & Stephan J Sigrist (2013): Restoring polyamines protects from age-induced memory impairment in an autophagy-dependent manner, *Nature Neuroscience*, Advance Online Publication, 1 September 2013, [DOI: 10.1038/nn.3512](https://doi.org/10.1038/nn.3512).

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