

Amino acid supplement makes mice live longer

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When mice are given drinking water laced with a special concoction of amino acids, they live longer than your average mouse, according to a new report in the October issue of *Cell Metabolism*. The key ingredients in the supplemental mixture are so-called branched-chain amino acids, which account for 3 of the 20 amino acids (specifically leucine, isoleucine, and valine) that are the building blocks of proteins.

"This is the first demonstration that an amino acid mixture can increase survival in [mice](#)," said Enzo Nisoli of Milan University in Italy, noting that researchers last year showed that leucine, isoleucine, and valine extend the [life span](#) of single-celled yeast.

In the new study, the researchers gave middle-aged, male mice extra branched-chain [amino acids](#) (BCAA) in their drinking water. The animals were otherwise healthy and eating standard mouse chow.

Animals that were given the extra amino acids over a period of months lived longer, with a median life span of 869 days compared to 774 days for untreated control animals, the researchers report. That's an increase of 12 percent.

Those survival gains were accompanied by an increase in [mitochondria](#) in cardiac and skeletal muscles. Mitochondria are the cellular components responsible for powering cells. The supplement-fed mice also showed increased activity of SIRT1, a well-known longevity gene, and of the defense system that combats free radicals. They therefore

showed fewer signs of oxidative damage.

The benefits of the amino acid supplements appear similar to those earlier ascribed to [calorie restriction](#), Nisoli said.

Treated animals also showed improvements in their exercise endurance and in motor coordination, the researchers report. (It is important to note that the animals in the current study were all male, Nisoli said. They plan to test the effects in females in future studies.)

The findings in older mice suggest that the supplementary mixture may be specifically beneficial for those who are elderly or ill. "It may not be useful in young people or body builders," who are already in good condition, he said. But it might be a useful preventive strategy, he added, emphasizing that the mice they studied "were just aged, not sick."

Nisoli emphasized that consuming amino acid supplements is different from consuming proteins containing those amino acids. That's because they do not have to be digested, and can enter the bloodstream immediately. "They come with no energy cost."

He suspects that BCAA nutritional supplements may prove to be particularly helpful for people with heart failure, the muscle-wasting condition known as sarcopenia, chronic obstructive pulmonary disease, or other conditions characterized by energy defects. In fact, there are already some small studies in human to support that idea and BCAA supplements are already available for purchase in several countries, including Italy.

The challenge, Nisoli says, will be convincing clinicians that these supplements might be a benefit to their patients. He says a large clinical trial is needed, but there is little incentive for companies to do such trials for dietary supplements as opposed to drugs.

Overall, Nisoli said the new work supports a "general philosophy of a nutritional approach to disease, aging, and problems of energy status."

Provided by Cell Press

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