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Taurine supplement has anti-aging benefits for animals. Can it be used for humans too?

Taurine is made by the body and found in food. It declines naturally with age. Study raises possibility that supplementation could slow human aging.

[KAREN WEINTRAUB](#) USA TODAY

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The amino acid taurine appears to improve health and extend the lifespan

Levels of taurine, which are made in the body and eaten in food, naturally decline with age. The study also looked at a group of 12,000 people and showed that those with low taurine levels were more likely to be ill.

Older mice whose levels of taurine are "topped back up" to youthful levels lived 10% to 12% longer and were healthier, leaner, had denser bones and were less likely to be depressed. Middle-aged monkeys, too, lived healthier lives for longer after receiving taurine supplements, according to the study, published [Thursday in the journal "Science"](#).

"Taurine somehow seems to hit the engine room of aging," said Henning Wackerhage, a co-author and professor of exercise biology at the Technical University of Munich.

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What's not yet clear is whether taking taurine supplements will make any difference for human health or lifespan.

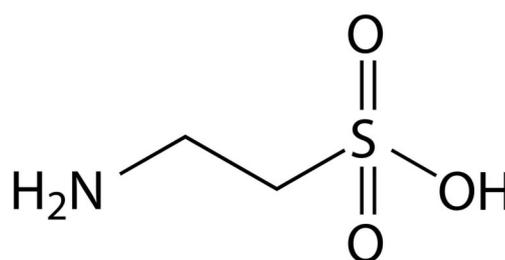
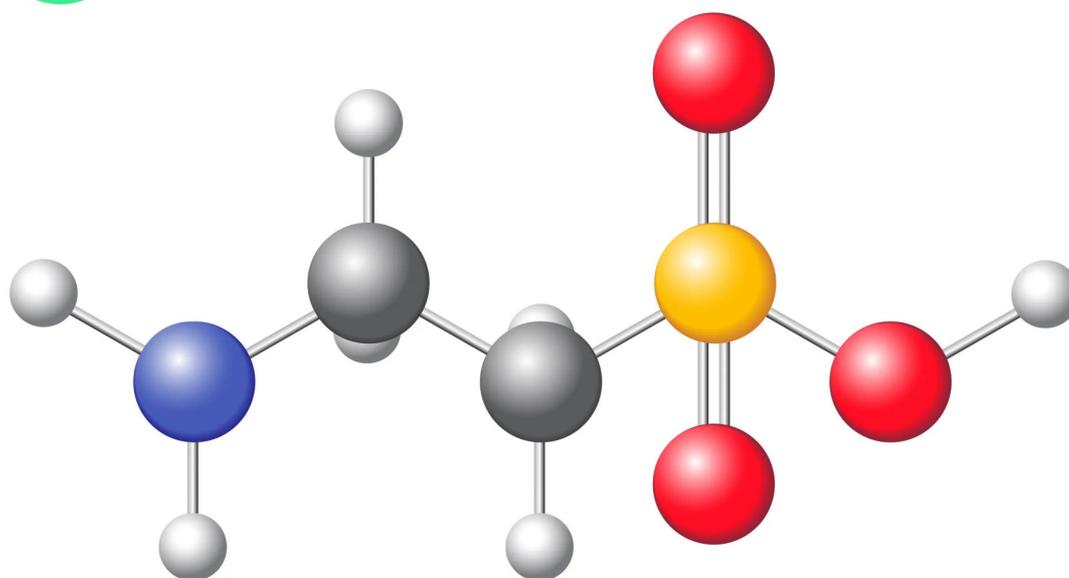
"There's quite a bit of smoke. Once we have a human intervention trial, we will know whether there's a fire or not," said Wackerhage, adding that neither he nor any of the study's authors received any funding from producers of taurine or related products.

To figure that out will take a large, years-long, very expensive clinical trial giving some people taurine and others a placebo. No plans yet exist for that.

I see it becoming one of the highest priority molecules for human testing, said Joseph Baur, who was not involved in the new study, but wrote an [accompanying perspective article](#) and is a professor of physiology at the University of Pennsylvania's Perelman School of Medicine.



Taurine



Taurine chemical formula and model. A new study shows supplementing taurine slows aging in worms, mice, and monkeys.

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What is taurine?

Taurine is produced by the human body, mostly in the liver.

It is involved in many biological processes, from helping absorb fats, to controlling a cell's volume to ensuring proper protein production in the mitochondria that power every cell, said Joseph McGaunn, a Penn MD/PhD

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It's still unclear how taurine might help slow aging, but it seems to have a positive effect on many hallmarks of aging at the cellular level, said Vijay Yadav, an assistant professor of Genetics and Development at Columbia University Vagelos College of Physicians and Surgeons, who helped lead the research.

Its broad effects in animals across organ systems are "almost too good to be true," Wackerhage said in a joint Tuesday call with media. "These mice, when they are on taurine, seem to be younger."

Natural levels are five-times higher during fetal development than after birth and drop across the lifespan for unknown reasons, he said.

By the time someone is in their 60s, their taurine production is about 80% lower than in childhood.

People also get taurine by eating animal products, particularly shellfish, Yadav said. The gut absorbs the molecule and then distributes it to different organs.

It's not easy or advisable to eat animal products to supplement taurine to the levels used in research, Yadav said. Eating too much meat can have negative health effects and many vegetarians live long, healthy lives, he noted.

Taurine is also included in many energy drinks. There, though the levels are high – three to six drinks contain as much as was tested on mice – other ingredients such as caffeine, might have different or contradictory effects.



Your body has it already, Wackerhage said. The question is how much, if any, is the right amount to produce anti-aging benefits in people.

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Is taurine safe?

Taurine hasn't been extensively studied for safety in people, but it has been added to energy drinks for decades with no evidence of negative health effects, Wackerhage said.

Some people drink as many as eight to 12 energy drinks a day – as much as two times the highest level of taurine tested in mice – with no sign that the taurine caused health problems, according to research by the European Food Safety Authority. (Though they did find health problems from the high caffeine levels and from mixing vodka with these drinks, Wackerhage noted.)

Animal studies have shown that taurine may change bone structure and interact with sex and growth hormone pathways, McGaunn said. "We do need to see whether that's actually happening in humans at these doses," he said.

Clinical trials will have to determine the most appropriate dosage, McGaunn said, and whether people should start taking taurine only after a certain age or when levels in their bloodstream fall below a certain, as yet undetermined, threshold.

"While any intervention has risks," Baur said via e-mail, "small clinical

What the study found

The new study results from a decade of research on yeast, worms, mice, monkeys and analysis of data from people.

In the human data, researchers analyzed metabolites in the blood of 12,000 people, along with their health status. High levels of taurine in the blood were associated with lower levels of obesity, type 2 diabetes and inflammation, suggesting those people were healthier. Such correlations do not prove that boosting taurine levels will improve health, Wackerhage cautioned.

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Heavy exercise was also shown to increase taurine levels in the blood, he said, perhaps suggesting one reason why exercise promotes good health. But it's not clear if exercise triggers more production of taurine or simply moves more of the amino acid into the bloodstream, he said.

To see benefits, mice were given the human equivalent of 3 to 6 grams of taurine per day.

Taurine first came to [scientific interest in 1975](#) when researchers trying to understand why household cats were suddenly going blind, realized their prepared food lacked taurine. Unlike people, cats don't produce taurine naturally, so their only source was from their diet.

This finding suggested that taurine can have major health effects and that its absence can be a problem, Wackerhage said. But it also points to the fact

How does taurine compare to other potential anti-aging molecules?

Like other molecules of interest, including metformin, nicotinamide adenine dinucleotide (NAD) and rapamycin, large-scale studies are lacking to support taurine supplementation.

Because there have never been long-term effectiveness or safety trials or head-to-head comparisons among these molecules, it's impossible to say whether one might be better at slowing aging in certain populations versus others or if they would be more or less effective in combination.

"You don't put all your money on one horse, but you have all the horses run," Wackerhage said. "Maybe some component works better for some people than others."

As frustrating as it seems, people will have to wait years for such research to show whether these are helpful, for whom and how they should be used.

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The anti-aging research field is enthusiastic about the potential for one or more molecules or drugs to slow aging or extend healthy lifespan, because it's possible to do in worms, mice and other animals.

"This study and others do indeed suggest we may be able to help people live healthier, longer lives through this type of research," McGaunn said.

"However, it's critical to balance our excitement about this work with caution and diligence."

of some animals, but people (including Wackerhage) find it nearly impossible to stick to caloric restriction long-term. And they may not want to. One [classic study](#) from 1950, which restricted volunteers' calories by 40%, found that in just over six weeks, participants were weaker, had reduced aerobic capacity, emotional distress, depression, loss of sex drive and suicidal thoughts, among other health issues.

A more recent example comes from telomeres, caps at the end of chromosomes that act as a sort of cellular ticking time bomb, telling cells when their useful life is over. People with short telomeres develop age-related diseases, leading to speculation that lengthening them would extend life. But a [May study in the New England Journal of Medicine](#) found that people with longer-than-average telomeres are more likely to develop cancer.

Those examples and others explain why researchers are cautious about jumping to conclusions about the life-extending benefits of activities other than the already proven advice to eat healthy foods, get adequate exercise and sleep, don't smoke or drink to excess and limit stress. Clinical research will show whether taurine supplements can have an additional benefit, Wackerhage said.

In the meantime, "I strongly recommend not treating anyone with taurine supplementation without the results of carefully controlled clinical trials," McGaunn said.

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