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Live Longer: The One Anti-Aging Trick That Works

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While the quest for the proverbial Fountain of Youth is endless and typically fruitless, one method known to extend the human lifespan by up to five years has quietly become accepted among leading researchers.

The formula is simple: Eat less. It could add years to your life, several experts now say. And done in moderation, it could at least help you live a more healthy life.

The only question is: Will the average person do it?

While little short of a nip-and-tuck will make you look younger, calorie restriction, as it is called, is as close to a real Fountain of Youth as any known technique comes. Even scientists who are cautious about anti-aging hype say it works, both by cutting risks for some diseases and by allowing all body cells, somehow, to hang in there longer.

"There is plenty of evidence that calorie restriction can reduce your risks for many common diseases including cancer, diabetes and heart disease," says Saint Louis University researcher Edward Weiss, who last week announced a new study that brings fresh understanding to how it works. "And you may live to be substantially older."

The numbers

Here's a rough rule of thumb that many experts generally agree on now: Eat 15 percent less starting at age 25 and you might add 4.5 years to your life, says Eric Ravussin, who studies human health and performance at the Pennington Biomedical Research Center in Louisiana.

One important caveat: Ravussin's estimate is based mostly on studies of other animals and only preliminary research in humans. But the work by Weiss and others is unlocking the mysteries of aging and suggesting the animal studies apply to humans.

"There is absolutely no reason to think it won't work," Ravussin told *LiveScience*.

Perhaps even more promising, though in early stages of research, are drugs designed on the basis of what's been learned from calorie-restriction studies. Those drugs would target human cells to deliver the same benefits, turning off bad things and turning on good things to extend cell life in general, or offer new therapies and cures to vexing diseases like Alzheimer's and cancer.

If you can hang in there until these promising new drug therapies are developed, you may live in

a world where lifespan increases by 10 to 15 years, researchers say.

Don't plan on living to be 200, Ravussin said, "but I think we're going to gain quite a few years."

Mysteries remain

Scientists aren't sure exactly why calorie restriction slows aging. But they're on the verge of a firm understanding. In a nutshell, it is thought to lower metabolic rate and cause the body to generate fewer damaging "free radicals."

One hypothesis is that it decreases a thyroid hormone, triiodothyronine (T3), which then slows metabolism and tissue aging.

Weiss and colleagues studied men and women, aged 50 to 60, who did not smoke, were not obese and were in good health. The volunteers were split into three groups — a calorie-restriction group, an exercise group, or a control group — and followed for one year. The calorie-restriction group cut back by 300 to 500 calories per day. (A typical healthy adult diet should include about 2,000 calories.) Volunteers in the exercise group maintained their regular diet and exercised regularly.

While both the calorie-restriction and exercise groups experienced similar changes of body fat mass, only those in the calorie restriction group also experienced lower levels of the thyroid hormone. A longer-term study is still needed to pin down whether reducing T3 levels through calorie restriction indeed slows the aging process as suspected, the scientists say.

The results were published in the June issue of the journal *Rejuvenation Research*.

Step-by-step

Weiss' work advances the body of anti-aging knowledge, said Christy Carter, an aging researcher and assistant professor at the University of Florida College of Medicine.

"The more that scientists can demonstrate similar biological profiles between rodents and humans with regards to calorie restriction, the greater the possibility that lifespan extension will translate to human as well," Carter said.

Weiss figured it's sensible to take steps now. You can cut 300 to 500 calories by simply skipping dessert or substituting a turkey sandwich for fast food. A nutritional diet and exercise are important to any weight-loss effort, Weiss and others caution.

"Our research provides evidence that calorie restriction does work in humans like it has been shown to work in animals," Weiss said. "The next step is to determine if this in fact slows age-related tissue deterioration. The only way to be certain, though, is to do a long-term study."

Others agree: more research is needed.

"I think that they've documented a real and interesting effect of caloric restriction in humans," said UCLA evolutionary biologist Jay Phelan. "But they are still a long way from demonstrating that it changes human lifespan at all."

Proven in animals

Evidence that calorie restriction boosts lifespans in rodents is solid. Christiaan Leeuwenburgh of the University of Florida's Institute on Aging showed in 2006 that eating just 8 percent less and exercising a little more over a lifespan can reduce or even reverse aging-related cell and organ damage in rats.

Various studies have shown that cutting calories by 20 to 40 percent significantly both extends life and, with a little exercise, leaves old animals in better shape.

Eating fewer calories also reduces age-related chronic diseases such as cancers, heart disease, and stroke in rodents. That's important because it suggests ways to not just make us live longer, but to allow us to age more gracefully, healthwise.

Research last year found that rats on a restricted diet are more physically fit in old age, apparently slowing the typical onset of physical disability. The rodents also looked and probably felt better: "Rats that ate a normal diet lost a significant amount of lean muscle mass and acquired more fat, while calorie-restricted rats maintained lean muscle mass as they aged," said lead researcher Tongjian You from the University of Buffalo. The finding was published in the October issue of the *Journals of Gerontology Series A: Biological Sciences and Medical Sciences*.

Rodents are thought to be good analogues to humans. Dogs are even better.

A 14-year study of 48 Labrador Retrievers found restricting their diets by 25 percent starting at 8 weeks of age extended their lives by an average of 1.8 years. For a creature that typically never gets beyond its early teens, that's a big number. The findings were published back in 2002 in the *Journal of the American Veterinary Medical Association*.

"The study also showed that lean body conformation forestalls some chronic illnesses, most notably osteoarthritis," said University of Pennsylvania researcher Gail K. Smith, who worked on the dog study. Ailments typically struck the lean dogs 2.1 years later than the others.

Probably works in humans

Convincing humans to eat less, and then studying the effects over a lifetime, is considerably more challenging. But mounting research suggests that what works for rats and dogs seems to apply to people.

Studies are under way with monkeys, which have lifespans of around 25 to 30 years, and early indications are promising, Ravussin said.

A study of humans last year found that cutting calories in human test subjects reduced oxidative damage in muscle cells. In the journal *PLoS Medicine*, the researchers speculated that the effect might translate into longer life.

Researchers caution, however, that longer lifespans does not mean immortality. The vast majority of mainstream researchers envision lifespans extending a few years.

"My estimate would be that 40 years of caloric restriction would give a 3 to 7 percent increase in

longevity, so an optimistic estimate would be an additional four years or so," said Phelan, the UCLA researcher.

But researchers are quick to point out that human nature is not conducive to life-long calorie-restriction diets. "It's going to be limited to a few people who are going to try to do that," Ravussin said.

Seeking balance

"Suffering years of misery to remain super-skinny is not going to have a big payoff in terms of a longer life," Phelan said back in 2005 when the idea of "living forever" was particularly hyped in the media. "I once heard someone say caloric restriction may not make you live forever, but it sure would seem like it. Try to maintain a healthy body weight, but don't deprive yourself of all pleasure. Moderation appears to be a more sensible solution."

Phelan uses rodents as an example of why caution is warranted:

Mice will live longer if their diet is restricted by 10 percent, he said in 2005. "If you restrict their intake by 20 percent, they live even longer, and restrict them to 50 percent, they live longer still. But restrict their intake by 60 percent and they starve to death."

In an email interview the other day, Phelan said he stands by this assessment.

And Phelan now thinks there is "nothing" on the research horizon "that would extend lifespan in a significant amount, on the order of 10 or more years."

Big promise?

Other experts are optimistic that research into calorie restriction will lead to greater things.

Scientists are investigating what they call CR mimetics, or compounds that mimic the effects of calorie restriction. "This includes naturally occurring compounds and pharmaceuticals," explained Carter, the University of Florida researcher. "One that has received much attention lately is a compound called resveratrol, found in red wine."

Researchers have long pondered the French paradox: The French eat high-fat diets but live relatively long lives. Resveratrol and other compounds in red wine are thought by many to contribute to that good life. But testing any anti-aging drug or therapy sets up another tricky paradox: Nobody wants to invest in a 70-year test, and the Food and Drug Administration won't approve a chemical's use without thorough testing. There's a potential shortcut: Researchers are testing compounds thought to thwart aging on Alzheimer's patients to see if they slow the degradation of neurons. And similar human trials will begin soon on diabetes patients.

"However, many of these studies are still in the development phase, still being tested in rodent models," Carter said. "I expect that this field will begin to explode in the next few years. Caution is still merited given the need for extensive study of these compounds as to their efficacy and long-term safety."

Eventually, Ravussin thinks the combined efforts of all these research angles could extend

lifespans by 15 years later this century.

In a society where lifespan has already increased significantly in recent decades, many people are at least as concerned with aging well as they are with living long.

"Many researchers are focusing on the effects of CR on health-span as opposed lifespan," Carter said. "We know that small reductions in caloric intake, even as little as 8 percent, result in improvements in health related outcomes."

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