Study analysis shows cutting calories might slow biological aging

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Credit: Duke University

Anti-aging serums, wrinkle creams and surgeries provide the promise of a youthful appearance that can go only skin-deep.

But a new analysis of a study by researchers at Duke Health suggests another method may actually work at a physiological level: calorie restriction.

Calorie restriction slows aging in worms, flies and mice. The Duke team wanted to test if it could have the same effect in humans, specifically regarding a concept called biological aging.

"Biological aging is the gradual and progressive deterioration of systems in the body that occurs with advancing chronological age," said Daniel Belsky, Ph.D., the study's lead author and assistant professor of medicine at Duke University School of Medicine. "If we can intervene to slow the rate of biological aging, it may be possible to prevent or at least delay onset for many age-related diseases and disabilities."

During the study, publishing online May 22 in the *Journals of Gerontology, Series A: Biological Sciences and Medical Sciences*, Belsky and co-researchers examined publicly-available data from the CALERIE trial, a study conducted by the National Institute on Aging in which 220 people were randomized either to restrict calorie intake by 25 percent or to maintain their current diet. The 145 people in the restriction group actually achieved, on average, a 12-percent reduction in calorie intake over the study's two-year duration. Seventy-five people were in the comparison group that did not restrict calories.

The researchers analyzed data from both groups from the start of the study and follow-ups after one and two years. They used two previously-published methods to measure how much biological aging occurred for each group.

The first method calculated a biological age for study participants based on their chronological age and biomarkers that measure the function of the cardiovascular, metabolic and immune systems and the liver and kidneys, including total cholesterol, systolic blood pressure and hemoglobin levels. At the study's start, the two groups had no difference in biological age as calculated by this measure. On average, the participants' biological age was 37 and their chronological age was 38.

At each 12-month follow-up, participants in the calorie restriction group saw their biological age increase by an average of 0.11 years. On the other hand, participants who ate their normal diets saw their biological age rise an average of 0.71 years per 12-month follow-up. The difference between the two groups was statistically significant, demonstrating that caloric restriction had apparently slowed the rate of biological aging as calculated by this method.

"Ours is the first study to test if caloric restriction can slow measured biological aging in humans in a randomized setting," Belsky said. "Our findings suggest a template for developing and evaluating therapies designed to mimic the effects of caloric restriction to ultimately prevent chronic diseases."

The researchers also conducted a second analysis that quantified biological aging as the amount of physiological deviation from a reference point defined by young, healthy people in their 20s from a separate dataset.

At the start of the trial, both calorie-restricting and maintenance groups deviated the same amount on average from the youthfulness reference point. Across one-year and two-year follow-ups, however, the average amount of deviation among the maintenance group remained unchanged, while the calorie-restricting group actually grew more similar to the young, healthy reference.

Belsky said the results were consistent with the slower aging researchers observed in the restriction group using the biological age calculation method.

"Interventions to control or counteract aging are at the forefront of medical research. However, chronological age—the age from birth—is less important than biological age—the actual age of one's physiologic systems," added co-author William Kraus, M.D., professor of medicine at Duke. "In this study, by applying these measures of physiologic age, we have demonstrated both their value and the apparent value of caloric restriction in slowing the aging process."

Provided by Duke University