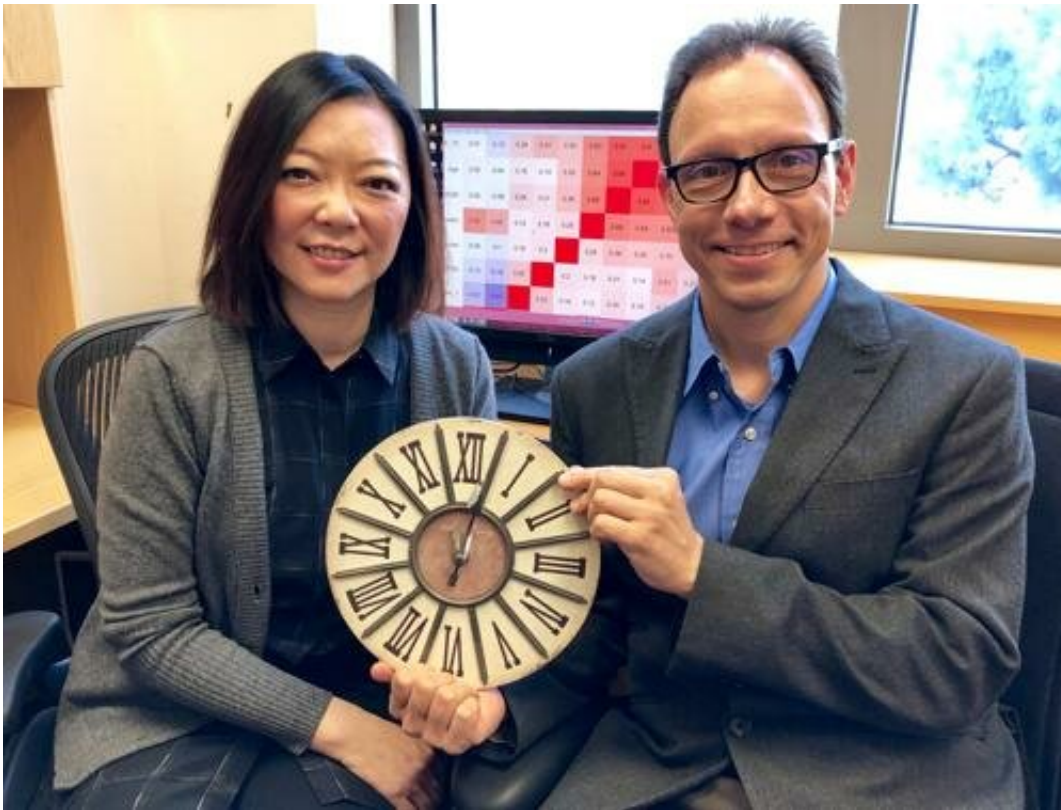


# DNA methylation GrimAge strongly predicts lifespan and healthspan

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Ake Lu and Steve Horvath from the Department of Human Genetics at the David Geffen School of Medicine University of California Los Angeles in Los Angeles, Calif. Credit: Elaine Schmidt, Senior Media Relations Officer, UCLA Health / David Geffen School of Medicine at UCLA

The Grim Reaper arrives for each of us eventually—wouldn't it be nice to know when? Now, UCLA researchers have developed a new tool to

help you plan ahead for your date with the Angel of Death.

Named after the grim reaper, the biomarker known as DNA methylation GrimAge, predicts lifespan and healthspan, and allows clinicians to test potential interventions that may slow or perhaps even reverse biological aging. The study is published in *Aging*.

Steve Horvath from the Department of Human Genetics at the University of California-Los Angeles, says, "When it comes to predicting lifespan, GrimAge is 18 percent more accurate than calendar age, and 14 percent better than previously described epigenetic biomarkers. With regard to predicting time to [coronary heart disease](#), GrimAge is 61 percent more accurate than chronological age and 46 percent better than previously reported epigenetic biomarkers. In spite of this significant enhancement, however, it must be noted that neither age nor DNAmGrimAge is particularly good at predicting time to heart disease."

The DNAmGrimAge biomarker measures an individual's risk of mortality by analyzing positions on the DNA where methyl groups change with age. These positions are analysed by applying DNA from blood onto a chip that measures the degree of their methylation, which is valued between 0 and 1, first author Ake Lu explains. "Over a thousand such specific positions are monitored by DNAGrimAge, which combines these values into an age estimate called GrimAge. If you fall within the top 5 percent of the fastest 'agers,' your risk of death is sadly more than twice that of the average person. If, however, you are within the bottom 5 percent of slowest agers, then your risk is only half that of the average person."

GrimAge is able to do this because the methylation positions for which it accounts are those that track the levels of blood proteins associated with health, as well as those that are associated with smoking history. It is well

established that smoking history is a good predictor of lifespan, but it is intriguing that the DNA methylation-based estimator of smoking history is an even better predictor of lifespan than self-reported smoking history. This may indicate that while patients can be economical with the truth about how much they smoke, DNA can reveal the truth in more ways than one.

This article also demonstrates that lean people with fatty liver and excess visceral fat are epigenetically older than obese people who do not have fatty liver. This highlights the fact that avoiding obesity is only one side of the health coin. There is a need to also to prevent excess accumulation of fat in the wrong places, and even in places that we cannot see.

Unsurprisingly, [lifestyle factors](#) and diet emerge once again as important health factors, as [omega-3](#) polyunsaturated fatty acid supplementation and vegetable consumption appear to be associated with lower GrimAge scores. This association, which was made from an observational study requires further validation from prospective clinical trials, before any advice to pop omega-3 pills is considered.

**More information:** Ake T. Lu et al, DNA methylation GrimAge strongly predicts lifespan and healthspan, *Aging* (2019). [DOI: 10.18632/aging.101684](https://doi.org/10.18632/aging.101684)

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