

Buy your telomere testing kit here! Evidence based or psuedo-science?

“Check your health with a Telomere Test,” [blares the Google ad](#) for Access labs, one of dozens of companies, mostly operating on the Internet or through drug stores, selling the latest medical fad: telomere testing. Anyone, without any medical oversight, can now purchase take home tests to monitor her blood sugar, drug use, ovulation and now, the length of your telomeres.

Telomeres? These are the DNA caps at the tips of chromosomes protecting the important information-carrying DNA in your cells from injury during cell division. They shorten as cells divide until they reach the [Hayflick limit](#) when they're too short to withstand any more division, essentially leading to cell death. (This happens in most cells, but not all.) After this discovery, decades worth of research has gone into finding a link between telomere length and aging, not just of each of our cells, but over the course of a human lifetime.

To be sure, we know that telomeres shrink as we age. That fact won the Nobel Prize in Medicine in 2009. But beyond that the story of telomeres can get a bit murky. As Daniel Engber writes in Slate, for every paper that finds a potential cause of telomere shorting, there's one that doesn't. [Or, more problematically, finds the contrary effect:](#)

A review from 2010 listed 10 studies of telomere length and early death, of which five found no association whatsoever. Different groups also tried and failed to link the length of telomeres with patients' blood pressure, lung function, and grip strength (an indicator of overall health). Some studies did find that shorter telomeres predicted cognitive impairment—cellular aging might predispose you to dementia, for example—but other analyses found the opposite.

But despite potentially shaky evidence, entrepreneurs are convinced there is a market for telomere measuring. For \$89 one can contribute both money and data to [Titanovo's Indiegogo campaign](#) to fund the first round of their direct-to-consumer telomere testing. In return you'll get an analysis of how long your telomeres are compared to those of heavy smokers, healthy eaters and regular exercisers. You can also, its founders point out, test again and again to monitor how your healthy lifestyle interventions are affecting their length.

This idea is flawed for many reasons. First, as Engberg writes, [there are a lot of discrepancies in the literature beyond the most general finding:](#) age and telomere length are related. We also know that women have longer telomeres than men, which fits with females' longer lifespan. But, [non-white people have longer telomeres than white people although they on average live shorter lives](#). Even though there are myriad considerations in lifespan discrepancies between races, it is one piece evidence that telomere data doesn't always fit the real world.

To the end, it's unclear if telomere length is really of any clinical value. Is it truly a valuable biomarker for unhealthy behaviors? Perhaps it is just another superficial sign, like grey hair and a shorter walking stride, of aging. [As James Coyne puts it on Science Based Medicine, this is the bear shit in the woods problem:](#)

I have previously talked about scat in the woods as a surrogate outcome for assessing the threat posed by bears; shooting or cleaning up scat has no discernible impact on the presence of or risk posed by bears.

Essentially, monitoring telomere length and even repairing it (if possible, more below) might be as pointless as dying grey hair in the fight against aging. It could be nothing but cosmetic. Additionally telomeres alone are not responsible for a cell death. There are lots of other cellular processes involved.

We know that telomeres are naturally repaired by the body using an enzyme called telomerase. It helps them stay long. But it is unclear whether eating a healthier diet, exercising more or [taking up mindfulness meditation](#), as some very prominent scientists suggest, will help the body create more telomerase and repair telomeres. Even if we could get more telomerase flooding through our systems, it's unclear that we would really want to. [Extra telomerase activity is found in 90 percent of human cancers.](#)

Engber, Coyne and writer [Harriet Hall](#) argue that telomere research has been a bit of an echo chamber. Most of the findings come from a group at the University of California at San Francisco and their immediate connections. Engber in particular takes a rigorous look at the dubious statistical methods the authors used to report at least one of their lifestyle affects, a study alleging soda was worse than cigarettes for cellular aging. "Many of the strongest claims about telomere length come from authors who already have a record of extravagant claims that are likely not to be reproducible in larger studies by independent investigator groups," [writes Coyne](#).

It is, however, not terribly unusual for scientists to keep working on a problem and for communities of scientists to develop around a single investigatory angle. Overspecialization and insularity is present, if problematic in many fields. What is unfortunate is when those scientists start hawking products. [There is at least one snake oil salesman selling a supplement that ups endogenous telomerase and reverses aging by growing telomeres.](#)

I don't think that the Titanonvo group falls into the same category. They are providing a service that will reliably and accurately measure telomeres for those consumers who are interested. So far, no one has reason to doubt that.

But the value of the service beyond the cool factor is unclear. This same problem plagues consumer genetic testing although it provides another dimension of information. A genetic analysis potentially indicates what health problems are of greater risk to a person. This could help prioritize specific lifestyle changes based on a genetic risk profile. At this moment telomeres can only tell you about aging, a phenomenon that happens to 100 percent of us 100 percent of the time.

Even if telomeres prove to convey valuable information and provide a signal of improving health, we have

to show they are better than other measures that come at much less cost. Tracking one's weight, breathlessness on the stairs, stress level or liquor bills are all more strongly related to lifestyle changes than telomere length. And they're free.

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Additional Resources:

- [Slowing the aging process: How the Mediterranean diet preserves your chromosomal telomeres](#), Genetic Literacy Project
- [Can mindfulness meditation protect your DNA?](#) Scientific American
- [Telomere hype: How to debunk claims about telomeres and aging](#), Science Based Medicine