

HEALTH

How to Live Past 100

Harvard researcher David Sinclair argues that aging is a disease that can be treated.

BY JACKIE COOPERMAN | HEALTH | SEP 11, 2019

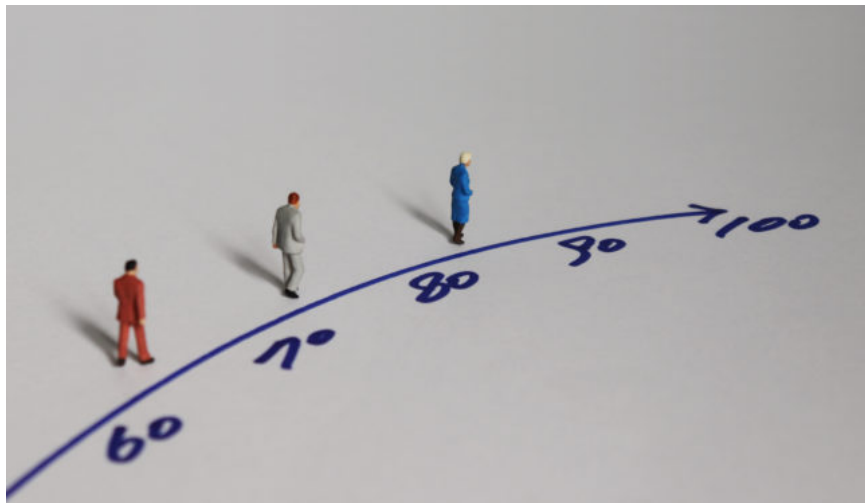


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David Sinclair, codirector of the Center for the Biology of Aging at Harvard Medical School, is optimistic. If we increase the quality of information our genes are receiving, he argues, we can increase health and lifespan. In his new book *Lifespan: The Revolutionary Science of Why We Age—and Why We Don't Have To* (Atria, September 2019), Sinclair explains his lab's groundbreaking research on longevity, and why he thinks we should all be playing tennis on our 100th birthdays. Sinclair, who just turned 50, spoke to *Worth* about how he stays fit, why he doesn't worry about overpopulation and how the right kind of stress can help us live longer, better lives.



David Sinclair. Photo by Brigitte Lacombe

Q: You say that we should look at aging as a disease, rather than as an inevitable process. Why?

A: The definition of a disease is something that happens over time, that causes a decline in function and that has to happen to less than half the population. That's an arbitrary cut off and is meaningless. We've never as a species accepted inevitability. We can change our lives for the better, and always have. We used to think pain during surgery and dying during childbirth were inevitable. We no longer accept that, and we shouldn't just accept aging.

What are "longevity" genes, and why are they important?

We've always known that our bodies are capable of healing themselves under the right conditions: Diet and exercise improve our health. But there are also ancient genetic survival pathways in every living thing. We can tweak these with molecules and the right lifestyle to give us the greatest chance of living healthfully into our old age and beyond. There are three main classes of longevity genes, and they respond to our environment. They are influenced by how we eat, how we exercise, if we're hot or cold. If we sit around and eat constantly and are never hungry, we give those longevity genes the impression that times are so good that they don't need to help us. They switch off.

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You write about activating the longevity genes through placing the body under just the right amount of stress, or hormesis. What are the most effective ways to achieve that?

You want to shock the body and not be constant. Intermittent fasting is an increasingly popular way: Skip breakfast, for example. Also lifting weights, losing your breath from exercise and alternating between hot and cold temperatures. We think these measures will only get us to 100 to 122 years old. That's our natural lifespan. We'll need something more than this to be productive and slow or even reverse aging. I believe we can go beyond what our bodies are able to do on their own. That's true for all of medicine. Exercising and dieting helps slow down cancer, but no doctor would say that's all you need to do. The good news is there are things we can all do right now.

One of the things that you and many of your colleagues do is take metformin, a drug usually prescribed to treat diabetes, and/or NAD boosters. What are they, and why do you take them?

The science of aging has progressed enormously over the last 20 years. We've gone from yeast and worms and flies to now understanding the pace of human aging. The science is convincing, and we are taking these molecules to forestall old age.

There are three main longevity pathways we know of: Sirtuins, proteins that regulate cell health, are one, and they require NAD⁺, nicotinamide adenine dinucleotide, a coenzyme found in all living cells. Sirtuins make enzymes that slow the loss of the epigenetic information. When we're hungry and exercise, they boost mitochondria, build new blood vessels and prevent cell death. AMPK, an enzyme that lowers blood sugar, is another one, and metformin is helpful there. The third one is mTOR, which regulates protein synthesis. It responds favorably to a low protein diet or to rapamycin, a compound which unfortunately has too many side effects to take regularly. The ideal combination, if it were safe, would be to take an NAD booster, metformin and rapamycin. Metformin is safe to take long term, and we don't know about NAD boosters. There is that risk.

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For readers who want to also take these molecules, are there specific doses and/or manufacturers that you'd recommend, and is it difficult to get prescriptions?

I can't make specific recommendations, but unfortunately these are not widely available. Since aging isn't looked at as a disease, no doctor can easily prescribe these to their patients. That's why aging should be declared a disease, so it could be treated. Sometimes doctors will prescribe metformin before people are diabetic.

Only 20 percent of our longevity is genetically determined.

You write that "our DNA is not our destiny." Why not?

Only 20 percent of our longevity is genetically determined. The rest is what we do, how we live our lives and increasingly the molecules that we take. It's not the loss of our DNA that causes aging, it's the problems in reading the information, the epigenetic noise.

You mention epigenetic damage from things like cigarette smoke and environmental factors like PCBs and radiation. What are your tips for avoiding exposure to these?

I travel a lot and avoid airport scanners if I can. I don't go in sun without sunscreen. I have as few X-rays and CT scans as possible. An MRI won't break DNA, but a CT scan will.

I'm not an immortalist.

You write "there are no biological, chemical or physical laws that say life must end." Do you imagine an eventual state of immortality?

I'm not an immortalist. It's similar to saying that there's no reason why we can't travel to the stars. It doesn't mean we can do it tomorrow, it just means that that's our limit. While there's energy and food available, life forms can endure. What do those organisms, like whales that live for 200-plus years, do that's different from us? We have an idea now. I don't see us living forever with any technology that I can see in the near future.

Do you believe there is an ideal lifespan?

It depends on the person. My 80-year-old father who just went hiking in Uganda with his grandchildren would say he'd like to keep going. When he retired in his late 60s, he thought he only had a decade to go, and that it was all downhill. His mother by his age was home-bound and didn't enjoy life at all. We have terrible genes, but he's been taking metformin for about five years and an NAD booster for about two. It's also important to note that he goes to the gym.

He's feeling healthier, younger and better about his future than he ever has. He's gone from a pessimist to a total optimist and started a new career. He seems to be speeding up in terms of his lifestyle and his health, and he's now no longer thinking that he's only got a couple more years to live.

Solving the problem of frailty is one of the biggest positive things you can do for the entire planet.

How do you grapple with the ethical issues your research poses?

We've always extended human lifespan, and the world has become a better place because of it. It's important to note that these gains in lifespan will be offset by huge savings in healthcare. We're increasing healthspan, not just lifespan. That's tens of trillions of dollars globally per decade that we can put to education and saving the environment. Population growth will level off within the next couple of decades, and healthier people are having fewer children. The global population is already stabilizing, and in many advanced countries going down, so people's fear that the world will be overpopulated with frail old people is completely wrong.

I argue that solving the problem of frailty is one of the biggest positive things you can do for the entire planet, from the economy to the environment.

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You mention the somewhat radical idea of vaccinating against aging by "resetting" cells. Do you think this will happen in the near future?

A few of my colleagues have found that senescent or "zombie" cells in the body are different looking than normal cells, so you could imagine you could vaccinate the body to be on constant lookout for senescent cells. It's similar to the revolution with how we treat cancer cells, so that the body can now see them and kill them.

What currently accessible body monitoring gadgets do you think are the most useful for the average reader wanting to improve his/her health and longevity?

I suggest wrist trackers that tell you your step count and pulse rates, and the Oura Ring is good because it tracks the amount and quality of sleep.

Imagine turning 40, and your doctor can prescribe medicine to help you before you have problems with aging.

How long do you think it will be before most people have things like continuous glucose monitors?

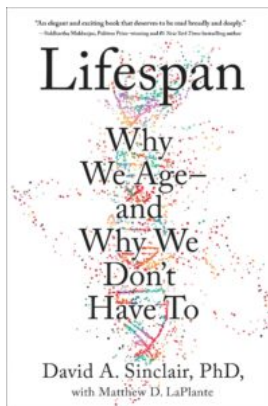
It's already happening for diabetics, but for healthy people it will remain niche. Most people can't even bother to go for a walk or a run, but it's something cheap and easy and it's very helpful to see what happens when you eat certain types of food, because we all respond differently.

How accurate are tests for things like biomarkers and for other health indicators like the gut microbiome?

They're rapidly improving in accuracy, though it's still early days. As the databases build up, they'll become more accurate in their predictions about what to do. Doctors typically only treat the person if they're very close to having a disease. These new monitoring methods are tailored to the person and geared to keeping the body in the optimal range before it becomes too late.

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In the book, you describe your daughter's harrowing wait for confirmation of Lyme disease, and how frustrating the lag time in diagnosis is. How long do you think it will be before a Lyme vaccine is reintroduced to the market?



I don't know if it ever will be. You can get it for your dog. What I can contribute is being able to detect not just Lyme disease but any disease in the body. I predict there are many viruses and bacteria that exist in the body that we can't find right now because they don't grow in a petri dish. We can get it through DNA testing.

You write that “when a doctor looks at a 50-year-old person right now, his or her goal is to keep the patient ‘less sick’, not to ensure that he or she will be healthy and happy for decades to come.” What are the implications of your research for how our healthcare system treats middle-aged patients?

I do think we'll improve. It's a grassroots movement right now. People need to demand that they get treatment before they're sick. We're working with the FDA to treat aging as a disease. Imagine turning 40, and your doctor can prescribe medicine to help you before you have problems with aging.

Given all of your research, do you think there is a reasonable mortality age, and if so, what is it?

I think that it would be great if everyone could play tennis on their 100th birthday. There is no optimal lifespan.