

Science AMA Series: We are writers for Science News, which just published a special issue about Aging, Ask us anything!

Science_News¹and/ScienceAMAs¹

¹Affiliation not available

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Abstract

I'm Tina Saey, the molecular biology reporter at Science News magazine. I'm a former scientist turned journalist. I write about things microscopic and molecular like cells and DNA and how they affect human health. I recently discovered my first gray hair. My story addresses what aging is, what can done about it, and whether slowing aging will make people live longer. (<https://www.sciencenews.org/node/192081>) I'm Laura Sanders. I am an award-winning science journalist who reports on the latest mysteries of the mind and blogs about the science of raising kids. I earned my Ph.D. in molecular biology from the University of Southern California in Los Angeles in 2008. Convinced that I was missing some exciting science development somewhere, I moved to Science News and began writing about brains in all shapes and forms. My story explores how the brain ages. That's a huge question, and one that's still mysterious in lots of ways, but it turns out that there are some interesting parallels between how the brain grows and how it ultimately declines. And some scientists hope that that relationship could ultimately point out ways to slow the mental decline that comes with age. (<https://www.sciencenews.org/node/192082>) I'm Susan Milius and it took a ridiculously long time to realize what kind of journalist I wanted to be. So after working as a freelance book editor trying to sneak active verbs into a book on the semantics of air passenger transportation, a food writer and some other improbable tasks, I finally realized that there were real careers writing about biology. Best beat in the galaxy! Just in the last few days I have had people tell me that certain lizards have green blood and bones, that the sort of cat-raccoon-looking creatures called binturongs smell like movie popcorn, and that there are bacteria basically fighting with spears. My feature on how the rest of the planet ages (meaning not humans) presents scientists who went to extremes testing whether some animals have found the secret of perpetual youth or whether there's such a thing as a creaky, frail, elderly roadside weed. (<https://www.sciencenews.org/node/192083>) We'll be back at 3 pm ET to answer your questions, ask us anything! *EDIT: Thank you for having us and for the awesome questions. We'll be checking in throughout the day to see if there are any other questions. *

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SCIENCE_NEWS [R/SCIENCE](#)

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Science AMA Series: We are
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How does one move from academia to science journalism? I am a PhD student in STEM who does NOT want to do research as a career and being a science writer has always sounded intriguing.

Communicating science to the public and increasing science awareness/understanding has always been an interest of mine.

[archenteron](#)

There are many routes to become a science journalist. The one I took involved going back to school after my PhD to get a master's degree in science journalism at [Boston University](#). There are other science journalism programs out there, too.

Check out the Council for the Advancement of Science Writing's [guide](#) for beginning writers. [The Open Notebook](#) has some excellent resources.

which just published a special issue about Aging, Ask us anything!, *The Winnower* 3:e146953.37479 , 2016 , DOI: [10.15200/winn.146953.37479](https://doi.org/10.15200/winn.146953.37479)

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You might also consider spending a summer as a [AAAS Mass Media fellow](#). Make sure your PI is on board, though. —THS

What exactly are caps of chromosomes, I have heard that those are responsible for aging and can be tweaked to reduce the pace or even stop aging process?

[Sai chander](#)

When we talk about the caps of chromosomes, we are indeed talking about [telomeres](#). Telomeres are basically repetitions of the DNA letters TTAGGG hundreds of times. Proteins glom on to this repetitive DNA and help stabilize the structures.

Telomeres shorten with age. (It's not clear whether that is really a sign of aging or an indicator of stress. The two may well be the same thing, or at least produce the same effect; an early death. As is apparent by the discussion, it's a matter of debate whether telomeres cause aging or are an effect of it.)

Usually, an enzyme called telomerase can compensate and keep telomeres long enough to protect the chromosome. But when the telomere gets too short two things can happen: A cell can kill itself in a programmed death called apoptosis. Or a cell can hunker down and become senescent.

Neither is necessarily a bad thing. Both are considered defense mechanisms against cancer. For instance, see [this recent paper](#) in *Aging Cell* for how defective telomeres counter tumor formation.

While shorter telomeres are used as one indicator of aging, it's not clear that lengthening them will make people live any longer. As [this review](#) points out, turning up telomerase to lengthen telomeres can have varying effects in different tissues, some good, some bad.

I think there is enough evidence to say that telomeres **alone** are not the cause of aging. They probably are [one factor](#) among many that lead to cellular aging. —THS

Is it safe to say that we all have genetic thresholds for lifetime calorie intake? Is there more to biological aging than telomeres, including disease? Would someone stop skin aging by avoiding the sun completely?

[xRedStaRx](#)

I think you are referring to work on caloric restriction that indicates that reducing the amount of food eaten (without compromising nutrition) can make animals live longer. There's big controversy over whether that effect is due to the number of calories consumed or to the type of food being eaten. Some research suggests limiting [protein](#) is what helps. Others say it is [when you eat](#) that matters.

Scientists are still working out the [mechanisms](#) by which caloric restriction works, so I wouldn't leap to the conclusion that there's a lifetime limit on calories consumed.

Skin isn't only aged by the sun. There's plenty of other insults it faces, too. —THS

Two questions:

1. I've heard that the first person to live to 150 years old has already been born, and the first person to live to 1,000 years will be born in the next ten years. Do you think there is any truth to this?
2. I read an article about a type of worm (I think) that was modified such that the cellular "stop caring"

process that begins after reproductive maturation was ceased. The research went on to say that humans undergo a similar process when our cells stop trying to repair themselves. What are, in your opinion, the most promising avenues for extending lifetime?

[dmtvile](#)

I'd like to hear Tina's thoughts since she focused on the human angle. But your question about humans living to some crazy age reminds me of a little guessing game that the researcher Axel Kowald plays with journalists who call to interview him about aging. He sets up the premise that science somehow figures out how to keep the risk of death among humans at the level experienced by college students. Some young adult humans do get struck down by unusual cancers or freaky diseases, but the rate is pretty low. And then he asks what the caller thinks would be the typical human life span in that case.

After some false starts trying to do probabilities in my head, I just guessed. Wrong and way low—which he says is what almost everybody does. The answer, he says, is that if medicine could indeed keep the human death risk at the level of young adults, the human life span would be in the range of 800 years to a millennium. SM

I would very much like to know how research into aging may benefit people who are middle aged or elderly now? More specifically, is there any research that can result in treatments in the very near future, or are the real world applications only going to be visible in the distant future?

[leftysrule200](#)

The basic science studies are still, well, basic. I would guess that any interventions or treatments to slow aging will be a long way off. One approach that I find fascinating has to do with the blood of youngsters. It's a total vampire scenario, but researchers have found that blood from young rats can rejuvenate old rats' [bodies and brains](#). If scientists could pinpoint the compounds that give young blood its magic, then they could presumably develop drugs that mimic that process. Right now, there's a clinical trial going on that's testing whether plasma from young people can help older people with Alzheimer's.

But in the meantime, there are plenty of studies that look at healthy aging in middle-aged or elderly people and ask what factors seem to make those people age well. A caveat: These studies are tricky to interpret because most of them turn up links between things. They can't say that one necessarily caused the other. Still, I think it's worth paying attention to some of these correlative studies. One line of research that I find compelling is on exercise. A [large Australian study](#) found that women who were more physically active in middle age had sharper memories twenty years later, for instance. From what I've seen, it seems that keeping the body physically active and strong is one of the best ways to keep your brain sharp as you age.--LS

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[leftysrule200](#)

This isn't a direct answer, but my own birthday fell during the time when we were writing these stories and I mused about what humans of any age can take away from current research. There are a lot of big possibilities floating around in the sky at the moment, but for right now, I found the biggest impact of aging research to be the perspective that some species have much more annoying trajectories than people do. There are some small Australian marsupials in which males reach adulthood in good health

and then commit so much biological effort to mating that the whole male population is dead within weeks. Suicidal reproduction, [the researchers call it](#). SM

Hi, thanks for the AMA.

At what age does the aging process start in humans or is it process by which our growth rate becomes less than cell death rate?

[monsoon_man](#)

This question gets at what we mean by aging, which is not a trivial problem because the answers change with the definition. I've been using the definition of changes in death rate (or maybe no change) as life goes by. So then aging starts at birth. In case you needed a gloomy thought. I can't resist asking if you've seen the video by SN's Helen Thompson on this question, especially the part where she talks about brain aging in the context of [jelly beans and Twizzlers](#). Not gloomy at all. --SM

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At what age does the aging process start in humans or is it process by which our growth rate becomes less than cell death rate?

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I had a source tell me that aging starts before we're born. He gave the example of fetal ovaries, which already start losing egg cells before birth. It's strange to think that we've already begun to age before we're born, but I think there's a growing appreciation among some scientists that aging gets started very, very early.

As I was writing my story about brain aging, I came up against the idea that development and aging are just two different ways of framing the same process of time marching along. You could almost argue that aging is just the end stage of development, or that development is the earliest stage of aging. --LS

What can be done today, or could be done in the coming 20 years, to decelerate or revert aging both naturally and artificially according to science? I saw Tony Wyss-Coray's TED, but was wondering if this or any less invasive treatment could become a business in the near future?

[kuroizero](#)

That's a toughie. Scientists have lots of different ideas, and it's impossible to know which one will pan out. Something that I came across in reporting my story on [brain aging](#) has to do with proteins that snip connections between brain cells. This process is called synaptic pruning, and it's mission critical to how the brain gets built. But some researchers now suspect that this process [goes into overdrive](#) in Alzheimer's disease, and even in normal aging. Interrupting this excessive snipping might be one way to protect the brain.--LS

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There is a lot of activity in the anti-aging world. In addition to the clinical trials Laura and I have mentioned, there is work being done on rapamycin. It's an immune-suppressing drug that was the first chemical shown to extend life span in mice. It mimics some of the effects of caloric restriction. It has problems, including promoting diabetes, but some people think in low doses and perhaps combined with metformin it could work for people.

Lots of [other drugs](#) are being tested in mice for their ability to extend life and health spans. So far, many of them make male mice live longer, but don't do much for females.

Another approach is to remove senescent cells from the body. Senescent cells are ones that have stopped doing their regular jobs and have entered a sort of stasis. They still send warning messages to their neighboring cells, which may promote inflammation and aging. Getting rid of these cells could stop that whole aging cycle. In mice, this has worked to [improve health](#). Of course, the mice were genetically engineered. For humans, you would probably need drugs that kill senescent cells (called senolytic drugs) but leave healthy cells alone. Several companies are experimenting to create such drugs.

Basic research continues to explore the root causes of aging. Until that is fully understood, I'm not sure if we can really stop the process. That doesn't mean people aren't trying hard. Many, many companies are exploring new ways to combat aging. Whether they will achieve the goal in the next 20 years is anybody's guess. --THS

Hi,

what would you recommend to age as smoothly and healthy as possible? This is a very open question, so I'm open to any answers ;)

[Zethsc2](#)

The research is pretty clear that people who lead active lives, eat more veggies and fruit than meat, and have engaged social lives tend to live longer and healthier lives. (There are always exceptions, of course, but that's the trend.) It sounds like boring advice, but until there's a proven anti-aging treatment I would say exercise (but try not to hurt yourself), boost the fiber in your diet, and have fun. --THS

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A big part of how you age has to do with your luck of the genetic draw. But for the things you can control, I think you're going to get different answers depending on who you ask. (This variety is something I bumped into as I was reporting my story. Every researcher had a different perspective on how the brain ages.) My take is that so far, the best hints we have are for pretty obvious habits: get lots of exercise, don't smoke and stay active socially.

There's an interesting study on a group of people from Scotland. These people took intelligence tests as kids in 1937 and 1947, and now scientists are following how they age. The project has some interesting results and a nice summary of [advice](#).--LS

Hello, im just wondering how would the mind (if free from natural degeneration of ageing) cope with a

body which unable to carry out its wants and desires? Would this not cause extreme frustration and stress.

[Wagamaga](#)

I hope you (and I!) never have to find out! That's what my dream is for aging research. I would keep my puny little human lifespan (versus a big tortoise's or a bristlecomb pine's) if I could live all of it with mind and body still functioning.--SM