

**What Happens Next – Sunday June 6, 2021**  
**Stopping Aging, IRS Audits, and China**  
**Andrew Steele**

Larry:

With that I would like to introduce our first speaker Andrew Steele who is the author of *Ageless: The New Science of Getting Older without Getting Old*.

Andrew Steele:

Every year you're alive, your chance of death increases by 10%. This doesn't start out so bad. I'm in my 30s, and my annual chance of death is something like 1 in 1,000 per year. It's worth thinking about what that actually means. If my odds of death stayed at 1 in 1,000 for the rest of my life, I could expect to live to 1030 on average. But clearly, that's not what happens.

That .001% per year, like morbid compound interest, gradually builds up. And by the time you're 65, your odds of not making 66 are more like 1%. At 80, your risk of death is 1 in 20. And if you're lucky enough to make it into your 90s, your chance of death is a sobering 1 in 6. Life and death in a role of a dice.

The reason that it's increasing the chance of death is an increase in the chance of disease, the risk of cancer, heart disease, stroke, dementia, and even the risk of death from Corona virus all rise exponentially with age too.

Do the math, and aging is easily the world's largest cause of death and suffering. Of the 150,000 people who die on Planet Earth every day, over 100,000 of them die because of aging. As a human, this sounds terrifying. We've all got this exponentially increasing wall of death coming at us at incredible speed. But as a scientist, this is fascinating because we've got this strange process that means our chance of death is rising so suddenly. But around the same age, no matter how old we are... no matter who we are, sorry. It suggests there may be some underlying process and, if we can understand that process, and intervene in it, we could all live much longer, healthier lives. It turns out that this process exists, and some animals have already cracked it.

One example is the Galapagos tortoise. The oldest recorded Galapagos tortoise, Harriet, made it to the ripe old age of 175 before she died. Further, what's more exciting is that Galapagos tortoises have a risk of death which doesn't rise as they get older. This is known as negligible senescence, the scientific phrase for not aging. And these Galapagos tortoises can, in a very real sense, be said not to age. They don't get more frail with time. They even stay reproductively active almost until the end of their lives.

Harriet was likely as sprightly at 150 years old as she was at just 50. She's, to say, not married. She is a tortoise. But her example shows us that aging isn't an iron law of biology but one we can do something about. So how can we be more tortoise and live longer lives which, most importantly, are healthy at the end?

Scientists are decoding the aging process. And we now know that some of the biggest factors behind the process are things that we can intervene in. The fundamental cellular and molecular changes that are behind everything from wrinkles and gray hair to frailty, forgetfulness and incontinence, to cancer and dementia. And the idea is that by intervening in these processes, we could delay or even prevent multiple age-related diseases and dysfunctions all at the same time.

Thanks to this new understanding, scientists now have dozens of different ways to slow, and even reverse, the aging process in the lab. From changing their diets, to manipulating their genes, to giving them drugs, we can turn back time in everything from individual cells to whole animals like mice. Perhaps the most exciting idea is removing a type of age itself, known as senescence cells, from the bodies of old animals.

Scientists have developed a new kind of drug called Senolytic. It can kill the senescent cells while leaving other cells in the body intact. Scientists gave these anti-senescent drugs to 24-month-old mice. Obviously, mice have a shorter lifespan than humans have; mice at 2 years is roughly equivalent to 70 in human years. And the drug basically made the mice biologically younger. They lived a few months longer, and maybe a few years in human terms, but they don't stumble on in geriatric ill health. The mice get less cancer and heart trouble, and fewer cataracts. They're less frail, and can run further and faster on the little mousey treadmills they use in these experiments. Then, more curious, like younger mice, and they even have better fur. These animals just look great.

So, what this shows is the senescent cells are a fundamental driver of the aging process, responsible for multiple dysfunctions and diseases that occur with age. Getting rid of them can delay many, or even all, of the signs of getting older, all at once.

And, most excitingly, these drugs are already in human trials. The first human trial of such drugs started in 2018, and there are now more than two dozen companies working to get these treatments from the lab into the clinic. But first, these will be treatments for specific diseases, where we know the senescent cells are implicated. But if these drugs prove effective and, most importantly safe, they could be the first examples of the dream of a real anti-aging medicine, a treatment that you could take in your 50s or 60s, hopefully before you get ill, which would pump the problems of old age a little further into the future, and allowing us all to live healthier or longer.

This idea could be the greatest revolution in medicine since the discovery of antibiotics. Medicines which, like antibiotics, can treat many different bacterial infections; can't just treat, but prevent, many, or even most of the diseases of old age.

The first of these exciting treatments could well be with us in the next 5 or 10 years and, with sufficient funding and a bit of luck, real anti-aging medicine could be here soon enough to improve the lives of most people alive today.

I think we should make it our mission to cure aging. Even if we don't quite make it as far as a cure, we'll all be able to enjoy some more healthy years. And, if we do succeed, we can dramatically reduce the burden of disease right across our aging global population, saving billions of lives and trillions of dollars. For this reason, I think the understanding and treating aging, is the single most important question in contemporary biology.

I wrote my book to raise the profile of this field. And I'd like all of you to help. What happens next is up to scientists, doctors, lawmakers, and all of us.