

When 150 is the New 100
Advances in Longevity and Human Health

By
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There's an old saying, "Nothing is certain but death and taxes," although there's an entire political party around today that doesn't seem to believe in the latter. What may surprise you, however, is that there's also a growing number of scientists who no longer accept the inevitability of death. This may seem strange given nobody has ever lived much past 100 years, and most not that long. So how can anyone seriously think death is not inevitable?

Our anthropocentric view of life can be partly to blame for such certainty. All humans ever to have lived have died, which is a pretty sound reason to conclude, "all humans are mortal," an inference that famously led Aristotle to explain the death of Socrates. But is it true that all living beings must die; that death is also inevitable for all of life? We know there are species of flatworms, jellyfish, lobsters, turtles, and other creatures that are not biologically mortal, meaning they don't die of old age. According to a 2006 *New York Times* science article, Christopher Raxworthy, a herpetologist with the American Museum of Natural History, says "the lungs, livers and kidneys of a centenarian turtle are virtually indistinguishable from those of its teenage counterpart."¹ He goes on to say, "Turtles don't really die of old age," and, "if turtles didn't get eaten, crushed by an automobile or fall prey to a disease... they might just live indefinitely."² Likewise, there are trees on Earth that have been around thousands of years, like some of the Great Basin Bristlecone Pines that first sunk their roots into the Nevada soil almost 5000 years ago.

As astonishing as it may sound, it is also true that when life began on Earth, in its exclusively cellular form, it was immortal and remained so for more than a billion years. "Many single-celled organisms *may* die, as the result of accidental starvation; in fact the vast majority do," writes cellular biologist, William R. Clark, "But there is nothing programmed into them that says they *must* die. Death did not appear simultaneously with life. This is one of the most important and profound statements in all of biology. At the very least, it deserves repetition: *Death is not inextricably intertwined with the definition of life.*"³ In his 1996 book on the origins of death, Clark reminds us that cells reproduce by dividing, that neither is and both are the original, and they don't leave a corpse behind in the process. Death came later, with the advent of more complex, multicellular creatures, at which time some cells became senescent, meaning their ability to replicate normally began deteriorating over time.

¹ "All but Ageless, Turtles Face their Biggest Threat: Humans," by Natalie Angier, *New York Times* (Science), December 12, 2006.

² Ibid.

³ Clark, William R., *Sex and the Origins of Death*, Oxford University Press, New York, NY, 1996, p. 54.

Today humans, like most, but not all, multicellular creatures on Earth are biologically mortal because our cells are senescent. As we age, they stop working like they're supposed to, leading to numerous age-related health issues, at least one of which will eventually kill us. There are, of course, other reasons animals die; death by predation, by injury, by inhospitable environments, and by disease, all of which can also kill the few immortal creatures still around. But even if none of these things kill us, humans will eventually die because of senescence, which is also called *biological death*. If this weren't the case, if we didn't age, it's estimated the average human lifespan would be about 6500 years. As Byron Reese writes in his book, *The Fourth Age*, "That's how long it would take for some freak accident to befall you, such as a grand piano falling out of a window and landing on you. In such a world, death would be even more of a tragedy, since an accidental death wouldn't just shave forty years off of your life, but four thousand."⁴

Today the average human life is a measly 79 years compared to that, but it's up from 47 years at the start of the 20th century. This increase is due largely to improvements in sanitation and medicine, "But it's a fact that nothing has changed biologically in the last century," biotech expert, Jim Mellon says. "If you take someone out of 1900 and put them in today's environment, they'll live just as long as we do."⁵ But in his 2016 book, *Juvenescence*, the opposite of senescence, Mellon argues that human longevity is in the process of taking a major leap forward. "In a nutshell," he says, "we believe that it is possible to extend average human life expectancy significantly just by using today's technology, to within a decade or so of today's current 'hard' ceiling of about 115 years."⁶ If he's right, that means adding another 35 to 45 years to the average human lifespan within the next ten years. "Nothing's changed to our fundamental biology," Mellon continues, "but today we're on the cusp of a major change. The biological engineering of humans, the rearrangement of our atoms and molecules to effect longer lives is with us. There are human trials going on at the moment. This is not science fiction."⁷

Shortly before I came to Spokane almost eight years ago, for example, a 29-year-old member of my congregation in Louisville had been diagnosed with stage-4 melanoma that had spread to his lungs and was told he had only 8 months to live. His family, needless to say, was devastated. Because he was young and otherwise healthy, however, and had nothing to lose, he was okayed to undergo a dangerous experimental treatment in an attempt to stimulate his own immune system to recognize and destroy his cancer. He's still alive today, has since married, has a child, and appreciates his life every day. The same year he was told he was both incurable and cured, the FDA approved a vaccine for the treatment of metastatic melanoma, based partly on his success. Since then, in just a few short years, the Agency has

⁴ Reese, Byron. *The Fourth Age: Smart Robots, Conscious Computers, and the Future of Humanity*, Atria Books, New York, NY, Kindle Edition, 2018.

⁵ Abundance 360 Conference, Module 6: Longevity and Vitality, January 2019.

⁶ Mellon, Jim, *Juvenescence: Investing in the age of longevity*. Harriman House. Kindle Edition, 2017.

⁷ Abundance 360 Conference, *ibid.*

approved immunotherapy treatments for nearly 20 kinds of cancer. What's remarkable about these cancer treatments, which are still in their infancy, in addition to potentially becoming the cure for all cancers, is that they fight the disease by altering a patient's own biology.

Between 2012, when Jim Mellon wrote *Cracking the Code*, about the biotech revolution, and 2017, when he wrote *Juvenescence*, he likes to point out that we've not only developed these immunotherapy treatments for cancer, but also Artificial Intelligence (AI) and gene editing, both of which have enormous medical application, and we've even cured Hepatitis C. "What happens in the next six years?" He asks. Answering his own question, Mellon predicts gene editing will eventually inculcate geroprotective genes, that already allow some humans to live much longer than most, into the general population. In the meantime, longevity researchers are focusing on small molecules, stem cells, and organ regeneration. I've recently begun taking a product myself called *Basis*, designed to promote cellular health by boosting NAD levels, a compound found in all cells that begins to decline as we age. Attempting to preempt age related deterioration and ailments with compounds, supplements, and diet in this way is now called *biohacking*, which, it turns out, even my spellcheck knows about.

Joan Mannick, the founder of a company called resTORbio, points out that aging is a biological program that can differ radically in species that are otherwise very similar. The Steamer Clam lives about 28 years, she points out, compared to a similar clam, the Ocean Quahog that lives up to 220 years. A painted turtle has an 11-year lifespan compared to a Galapagos Land Turtle's span of 193 years. And a common mouse lives about 3 years compared to its cousin, the Naked Mole Rat, that lives 28 years. Lifespan, it would seem, is rather arbitrary. What makes the difference, Mannick says, has to do with TORC1 production, a protein complex that's active while eating and inactive while fasting when we're young. But as we grow older, TORC1 remains active all the time, and is associated with the development of age-related health problems. It's not as present in those species that tend to live longer. Inhibiting it, according to resTORbio, "has been observed to prolong lifespan, enhance immune function, ameliorate heart failure, enhance memory and mobility, decrease [body fat] and delay the onset of aging-related diseases in multiple animal studies." Mannick says her company is initially working to impact respiratory infections, which are a leading cause of death in seniors. During Phase 2 trials involving 900 patients, they've already achieved a 40 percent reduction in respiratory infections.

Samumed is another company specializing in regenerative medicine by creating treatments that make use of the WNT pathway, a protein that signals the regenerative properties of cells in all creatures. WNT is abundant when we're young, but not so much as we age, which is why bones heal easier, our joints don't wear out, and we don't go bald when we're kids. Sumumed has already had success growing new cartilage in bad knees with a single injection of the WNT pathway. This treatment is now in Phase 3 clinical trials, which means it may soon be approved by the FDA and end the need for evasive joint replacement surgeries.

When overactive, the WNT pathway can also cause cancer by overproducing cells. So Samumed has developed a treatment to also inhibit WNT, which is currently in Phase 1 trials. They were allowed to thoroughly treat a 30-year-old woman with it, under the Compassionate Use Act, because she had terminal pancreatic cancer, was down to 70 pounds, and was sent home to die. After a year of treatment, her cancer is gone, she weighs 130 pounds, is athletic and living a normal life again. Samumed also has an Alzheimer's treatment in Phase 1 trials. It was given to an 80-year-old woman, also under compassionate use, who was bedridden, nonresponsive, and unable to walk, eat, talk, or recognize her family. Within three months of treatment, she could do all those things again. Samumed has six treatments for other age-related conditions currently in Phase 1 human trials, as well as treatments for osteoarthritis, as mentioned, and male pattern baldness in Phase 3 trials.

Celularity, Inc. is a medical company specializing in stem cell research and regenerative treatments. The company recognizes stem cells, which easily replenish whatever cells our bodies need when we're young, exponentially decline as we age, leading to all the cardiovascular, pulmonary, cognitive, or cancer diseases that 80 percent of people over age 65 have at least one of. In their research, animals that have had their stem cells replaced live 40 percent longer than their counterparts. Celularity is using placental stem cells, which are similar to receiving blood from a universal donor (so they won't be rejected by their host), to develop treatments that will actually reverse the aging process and help keep us active and healthy no matter how old we are.

I'll mention one other company before moving on. *Elevian* is developing treatments based upon studies showing animals "transfused with the blood of young animals, experience regeneration across many tissues and organs. The opposite is also true: young animals, when transfused with the blood of older animals, experience accelerated aging." This is so, the company says, because of a molecule known as GDF11, or "growth differentiation factor 11," which, again, becomes scarce as our cells undergo senescence. GDF11 supplementation "accelerates skeletal muscle repair, improves exercise capacity, improves brain function and cerebral blood flow, and improves metabolism." In 2014, *Science* magazine named Elevian's findings one of the top 10 scientific breakthroughs of the year. Two years later, a similar drug produced by another company, which actually reduces senescent cells, was named the breakthrough of the year.

So why talk about these breakthroughs during a church service on Sunday morning? Firstly, because this isn't just any Sunday morning church service; this is a Unitarian Universalist service where anything goes! Not so, but ours is a religion that has long valued science as a source of truth and inspiration. As the bylaws of this very congregation stated in 1888, "the authority for its belief is reason; The method of finding its beliefs is scientific; Its aim is to crush superstition and establish facts of religion..."⁸ Today, as a result of merging with Universalism's anything goes attitude, some may think talking about extending our lives isn't

⁸ McDowell, Esther, *Unitarians in the State of Washington*, Frank McCaffrey Publishers, 1966. p. 97.

very “spiritual,” or goes against nature. But I’d argue such opinions have no bearing on the matter since it is already upon us and is happening. Remember, I’m the preacher who thinks church is about dealing with reality, not escaping it.

On the other hand, what can be more spiritual than the possibility of living longer and healthier lives, and what’s more natural than the desire of any creature to survive? There’s a scene in the 1985 Ron Howard film, *Cocoon*, about a group of people in a retirement community who discover a swimming pool with rejuvenating powers. Toward the end of the film, one of the aliens responsible for the technology invites some of them to leave Earth with him and go where they won’t have to worry about dying or aging ever again. “You would be students of course,” the alien says, “but you’d also be teachers. And the new civilizations you would be traveling to would be unlike anything you’ve ever seen before. But I promise you, you will all lead productive lives.”

“Forever?” Ben Lockett, played indelibly by Wilford Brimley, asks.

“We don’t know what forever is,” the alien replies.

Ben then turns to Mary, his spouse, who seems reluctant. “So you think it’s like Bernie said? We’re cheating nature?” He asks.

“Yes,” Mary says.

“Well, I’ll tell ya, with the way nature’s been cheating us, I don’t mind cheating her a little.”

I suspect those among us who are young at heart—young souls trapped in aging bodies—can relate, and, given the opportunity to feel better and be as active as they’d like, would also say yes to what may currently sound like alien technology. But however one might respond, it’s a question we must all begin thinking about because these advances in science and medicine are happening, accompanied by many ethical and social ramifications.

Currently, the fastest growing demographic everywhere on Earth is 65-year-olds, 80 percent of whom, again, have at least one age-related illness. And with the global population decline causing most countries to now be below their necessary replacement birthrates, there are going to be fewer young people to help replenish the financial and workforce needed to care for a society dominated by elders. One solution is to dismiss anti-aging technologies as unnatural and selfish, and condemn everyone to die around a normal age, which was around 30 years until the 18th century, 47 in 1900, and almost 80 today. How would we feel today if a hundred years ago our society had said, “Sorry; sanitation, antibiotics, and vaccinations aren’t natural. You’ll just have to die before you’re fifty.”

It seems a better, more humane, and more likely solution is to reverse the impacts of aging, eliminating rising eldercare costs in the process. According to a *60 Minutes* story about a decade ago now, Medicare annually pays more to doctors and hospitals in the last two months of patients’ lives than the entire “budget for the Department of Homeland Security,

or the Department of Education.”⁹ More than \$125 billion Medicare dollars, about a quarter of its annual budget, goes to 5 percent of its recipients during their last year of life. Imagine what we could do with that money if it weren’t being spent on age-related illnesses, and wonder what we’ll do if such a program runs out of money because its overwhelmed by the number of people who need it and no longer has enough young people working to replenish it. If we can cure these illnesses or prevent them from every happening to begin with, we should, because, as Wilford Brimley would say, “It’s the right thing to do.”

Living longer and healthier also requires us to think more deeply about our moral obligations to younger people. How do we continue to live long, healthy, productive lives without robbing them of the opportunities to do the same? If older folks aren’t retiring, where will some of them find jobs? And if we’re still healthy enough to work, but don’t, what will we do with our time? What will society look like when people are active for more than a century, and probably much longer as technologies continue to exponentially advance? More importantly, what do we want it to look like? If we’re planning to reengineer our biology, we ought to simultaneously plan to reengineer how our society is going to work. Let’s not just wait and see.

The times we’re living in are as exciting as they are uncertain, filled with as many problems as there are possibilities, and as much reason for dread as there is for hope. That the future remains uncertain is a truth that will probably never change; but humanity is also on the cusp of a transformation once imagined only by science fiction. As a placard I read not long ago stated, “People have no idea how fast things are changing,’ Spread the Gospel.” Increasingly, I feel this is part of my job as a minister to help us all adjust to living in a world of exponential changes. There’s no wonder anxiety is the fastest growing disorder among young people. Things are changing faster than most of us can keep up with. But if we can relax a little as we slip down the rabbit hole, who knows what wonders we might experience? Who knows what beauty might break free from the cocoon that has so long encrusted us? As far as we know, life is one of the rarest occurrences in the Universe, and, on a cosmic scale, a gift that is all too brief. I hope more of us, eventually all of us, can enjoy this rare gift to its fullest for as long as possible.

⁹ <http://www.cbsnews.com/news/the-cost-of-dying-end-of-life-care/>