

- Mark your confusion.
- Purposefully annotate the article (1-2 mature, thoughtful responses per page to what the author is saying)
- Write a 250+ word response to the article.

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## **Can human mortality be hacked?**

By *The Week* Staff, 03-24-19

*A fringe group of scientists and tech moguls think they're closing in on the fountain of youth. Here's everything you need to know:*

### **What is biohacking?**

Silicon Valley is built on the idea that technology can optimize, or "hack," any aspect of our lives — so why not the human life span? Until recently, anyone hawking pills or treatments that promised to restore youthfulness was considered a quack, yet a growing number of "transhumanists" are convinced that, in time, human beings can be transformed through bioengineering, and that aging will be curable just like any other malady.

In light of rapid gains in gene editing, nanotechnology, and robotics, some futurists expect this generation's biohackers to double their life spans. Aubrey de Grey, a regenerative medicine researcher backed by tech mogul Peter Thiel, insists that someone alive today will live to be 1,000. "It's extraordinary to me that it's such an incendiary claim," de Grey says. Korean physician and financier Joon Yun has offered two \$500,000 prizes to anyone who can restore a test animal's youthful heart rate and extend its lifespan by 50 percent. For humans, the mortality rate at age 20 is 0.001 percent, Yun figures, "so if you could maintain the homeostatic capacity of that age throughout your life, your average life span would be 1,000."

### **How could that be achieved?**

That's the million-dollar question, but Harvard Medical School researchers believe they might know where to start. Humans grow fewer blood vessels in their muscles with age, which is believed to result in the gradual breakdown of vital organs. The same pattern exists in mice. In 2018, Harvard researchers fed mice a chemical to manipulate the gene associated with blood vessel growth and found that old mice subsequently were able to run on a treadmill 56 percent longer. While that work continues, biohackers are transfixed by nootropics — "smart drugs," amino acids, and other supplements that purportedly boost cognitive abilities and prevent brain aging. The market for these self-described cognition boosters is expected to top \$11 billion by 2024.

### **What other techniques are used?**

One poster boy of biohacking is Bulletproof Coffee founder Dave Asprey, who recently turned 45 and is certain he'll live to be at least 180. Last year, a doctor extracted stem cells from Asprey's bone marrow and injected them in organs and joints throughout his body, a process Asprey intends to repeat twice annually in the belief he's refreshing his body with brand-new cells. He takes 100 supplements a day, and has equipped his British Columbia home with gadgets such as a hyperbaric oxygen chamber and a platform that vibrates 30 times a second to stimulate his muscles. By Silicon Valley standards, Asprey's life-span goal is modest: Oracle's famously arrogant co-founder, Larry Ellison, says he finds mortality "incomprehensible," and Google's co-founders, along with Facebook's Mark Zuckerberg, are also investing in ways to extend human life. Tesla CEO Elon Musk founded Neuralink to develop digital implants for our brains. If we don't use technology to enhance our cognitive abilities, Musk reasons, artificial intelligence is destined to conquer humanity.

## **How big is the movement?**

There are tens of thousands of biohacking entrepreneurs and basement hobbyists in the U.S., many of whom gather at an annual convention in Austin. Some biohackers are even experimenting with the gene-editing technology CRISPR and have posted videos in which they inject themselves with homemade treatments. The biggest obstacle for biohacking, de Grey says, is the "popular misunderstanding of the nature of the crusade." In a 2016 survey, 69 percent of Americans opposed using brain chips to improve cognitive abilities, and 63 percent opposed using synthetic blood to make people stronger and faster by boosting oxygen levels. The poll showed a widespread distrust that these enhancements would be used responsibly and safely.

## **Are scientists on board?**

Most are either skeptical or firmly opposed to any effort that purports to reverse aging or extend human life spans indefinitely. University of Michigan professor Richard Miller wrote an article co-signed by 28 aging experts, who called de Grey's life-span goal "so far from plausible that it commands no respect at all within the informed scientific community." The oldest humans have lived to about 120, a feat that hasn't been topped in recent decades despite vast improvements in health care. That fact has led many experts to believe that's pretty much the biological ceiling for human longevity.

## **Is superlongevity truly desirable?**

Biohackers claim they're only accelerating evolution, but many ethicists believe something much graver is at stake. Political scientist Francis Fukuyama cited the transhumanist movement as among the most serious threats to humanity — not only because of the potentially disastrous consequences of botched treatments but also because of the equally alarming possibilities of success. For centuries, claims that one group of people was superior to another were based on junk science and myth. If the dreams of biohacking are realized, wealthy people who can afford a wide array of enhancements will be "genuinely superior" to the rest of humanity, British technology ethicist Blay Whitby has warned. "We need to think about the implications before it is too late."

## **The cyborgs among us**

The most fanatical biohackers don't just use technology — they want to integrate it into their bodies. "Grinders" — a term adapted from a dystopian comic book — install hardware in themselves to gain superpowers of a sort. Rich Lee, a 40-something cabinetmaker in Utah, is one of them: He has installed a forearm chip that monitors body temperature, finger magnets that open car doors, and headphones permanently implanted in his ears. The grinder movement began in 1998, when British professor Kevin Warwick implanted a radio-frequency identification device, or RFID, into his arm so he could turn on campus lights by snapping his fingers. In the past few years, thousands of people in Sweden had RFIDs the size of a grain of rice implanted in their hands. Costing about \$180, the devices can replace keys, passwords, and e-tickets. Biohacking entrepreneurs are designing RFIDs that will monitor blood pressure, heart rate, glucose levels, and other vitals. One downside for grinders: You can't upgrade a device without cutting out the old one.

## **Response option(s):**

- What is the gist of biohacking?
- Some ethicists argue that biohacking is wrong. Which, if any, of the approaches to biohacking do you agree with? Explain.
- Pick a passage from the article and respond to it.