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Wellness

The Science Behind Measuring (and Reversing) Your Body's "Biological Age"

From simple fitness tests to deep looks into cellular DNA, longevity doctors and influencers are working on the body's odometer.


By **Andrew Zaleski**

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Ever since selling his payment processor to eBay for \$800 million in 2013, Bryan Johnson has dedicated himself to optimizing his health—a journey that involves

spending a couple million dollars to make his 45-year-old self function like a man less than half his age. “[H]e has the heart of a 37-year-old, the skin of a 28-year-old, and the lung capacity and fitness of an 18-year-old,” wrote *Bloomberg Businessweek* in January. Achieving ideal health involves such measures as eating exactly 2,250 calories a day, ingesting dozens of supplements, tracking nighttime erections, and, at least until recently, swapping plasma with his 17-year-old son. (Or, as *the New York Post* put it, “Tech tycoon who spends \$2 million per year to retain youth uses teen son as ‘blood boy.’”)

Johnson is the most recent poster-child for the pursuit of youth at all costs, but he’s certainly not the only one trying to keep old age at an arm’s length. Moneyed bros, Silicon Valley CEOs, and even average Joes are all trying to look, feel, and be younger, to slow down the aging process in order to live healthier for longer. There are longevity clinics that charge patients \$100,000 a year, cocktails of drugs that can “de-age” people, custom backyard “cold plunges,” and even a non-denominational church that worships the notion of perpetual life.

Underneath all anti-aging interventions rests the same basic health factor that people like Johnson are trying to fine-tune: biological age. At its most basic level, it’s the idea that the health of your tissues and organs exists independently of the number of candles on your birthday cake. Put another way, your physiological state is probably younger or  than the chronological number of years you’ve lived on this planet.

“Absolutely, biological age exists,” says Dr. Nir Barzilai, director of the Institute for Aging Research at the Albert Einstein College of Medicine in the Bronx.



Calculating biological age can be done in various ways, and scientists over the last decade have tried to develop different “aging clocks” to determine physiological health. The Mayo Clinic, for example, has an EKG clock that can gauge the biological age of someone’s heart. When Barzilai was 58—he’s almost 68 now—he took the Mayo Clinic’s clock, which told him he actually had the heart of a 54-year-old man.

Epigenetic clocks are currently considered the most accurate way to measure someone's biological age, as they're an unbiased look into a person's cellular functioning. (Think of it like the body's CarFax report.) Epigenetics refers to **gene expression**, the first step toward constructing **proteins**, the building blocks of life. Chemical changes are happening all the time to the DNA code inside our cells in what's called methylation, a process that turns genes on or off as we age. Sleep, stress, nutrition, exercise, the amount of UV light we get—all this, and more, can lead to epigenetic changes in our cells, and it's generally thought that the more methylation cells undergo, the less efficient they become. Basically, they start breaking down.

“Epigenetic clocks became really well known because, with a blood draw or with a tissue sample or a cheek swab, you can now monitor DNA methylation,” says Robert Brooke, CEO of the nonprofit Epigenetic Clock Development Foundation. “The field is now largely **in agreement** that epigenetic clocks are a very promising approach and probably the single most reliable molecular biomarker of aging.”

This is how someone like Chris Mirabile, founder of longevity-biotech company NOVOS Labs, **justifies his claim** that while he's 39 years old, his **biological age** puts him in his mid-20s, data he shares on **Slow My Age**. If you'd like to figure out your own number, a test is **available from his company for \$349**.



There are other metrics that can be considered as well. Johnson told GQ his most recent test of his body's VO2 max, the body's ability to use oxygen, ranks him in the top 1.5 percent of 18-year-olds. The \$2 million he spends every year funds a team of 30 doctors and an array of tests, treatments, and supplements in an attempt to slow his aging process to a crawl. Johnson, like Mirabile, also shares his health information online; he calls it **Blueprint**.

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“What we’re trying to do is assess the biological age of every part of my body, and then once we understand that age, we’re trying to reverse it as much as we can,” he says.

To Brooke, that’s the hard part: Knowing your biological age is one thing, but “if we’re going to make a major dent in the aging process,” he says, “we’re going to need some pretty innovative treatments.” There are already companies that are working on rejuvenative therapies aimed at turning back the biological clock on heart and muscle tissue.

The practical implications of this science for the average guy are not so extreme. Barzilai says there are simple steps that people can take right now to make a dent in their own biological age. It comes down to four elements: exercise, nutrition, sleep, and social connectivity. “If you target those four, he says, “then you can really make a major advance.”



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