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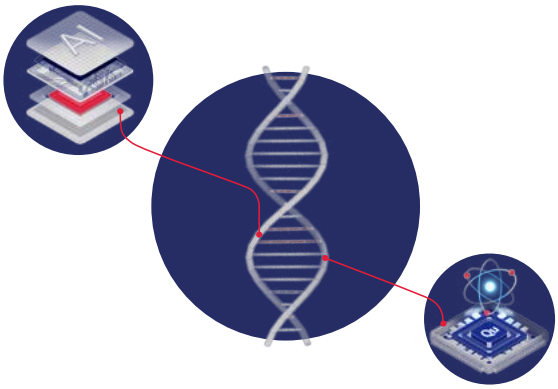

BREAKTHROUGH TECHNOLOGY DIALOGUE ASIA PACIFIC 2025

Lengthening longevity

Medical advances are reframing what it means to age

Key takeaways:

- Breakthroughs in understanding the biomarkers of aging are fuelling longevity science.
- AI and quantum computing are supercharging the process of drug discovery.
- Dual-purpose therapeutics simultaneously targeting aging and chronic diseases are key investor targets.

On the surface, it might seem like a fairly straightforward decision. Presented with the following two alternatives, which would a middle aged person opt for: guaranteed life until age 95, or bet on scientific advancements extending it to beyond 100?

Current lifespan statistics potentially tilt toward the former option. According to the World Health Organization (WHO), the global average life expectancy for a woman is 74 years and 68.9 for a man.[1] In 2024, there were a total of 722,000 centenarians among a global population of 8.2 billion.[2,3]

One person opting for the latter, however, is Dr. Alexander Zhavoronkov, founder and CEO of Hong Kong-headquartered Insilico Medicine. Speaking at Bank of America's Breakthrough Technology Dialogue in Singapore in February 2025, he predicted that it will not only become commonplace to live to 120 (lifespan) but to live well to 120 (healthspan).

Dr. Zhavoronkov says:

> *"My hope is that within the next 20 to 30 years, we're going to live in a world where aging is something that can be controlled.*

A recent study in Nature Ageing argued that such an extension of human lifespans beyond the current upper 122.45 year limit recorded by France's Jeanne Calment is "implausible in this century."[4]

Dr. Alexander Zhavoronkov, Insilico Medicine, plans to live well to 120.

Yet, the statement carried an important rider: implausible "unless the processes of biological aging can be markedly slowed." And targeting those underlying causes of aging is exactly what longevity scientists like Dr. Zhavoronkov are attempting.

A number of factors are driving this hypothesis. They include breakthroughs in understanding the biomarkers of aging, then using AI and potentially quantum computing to accelerate the discovery of treatments and drugs to prevent or delay its onset.

Most notably, this involves slowing the loss of bodily functions that triggers chronic diseases like diabetes, heart disease, stroke, cancer and dementia. These diseases are currently growing in both prevalence and cost — to an estimated U.S. $47 trillion worldwide by 2030.[5]

The social and economic consequences of overturning chronic diseases would be enormous. And improvements are certainly possible. The one point doctors agree on is how many can be prevented or delayed by addressing unhealthy lifestyle choices (physical inactivity, poor nutrition, smoking and excessive alcohol), plus environmental exposures like pollution.

Changes can, for example, alter the way that genes express themselves by turning certain ones on or off (epigenetics) without changes to the underlying DNA sequence.

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Many governments are consequently trying to improve national finances and their citizens' healthspans by pivoting healthcare systems away from the treatment of diseases to the prevention of them. Data from wearables should progressively facilitate this, providing doctors and patients with a continuous flow of information about the impact that medicines and lifestyle changes are having.

The biomarkers of aging

DNA tests that highlight genetic risks and blood tests that generate personalized biomarkers are providing the foundations for the kind of precision medicine which will enable individuals to enjoy longer, healthier lives. Understanding the biomarkers of aging means that it is now possible to pinpoint whether someone's biological age is higher or lower than their chronological one without looking at their outward features.

Dr. Zhavoronkov explains:

> *"These biomarkers are not only helping us to evaluate the anti-aging properties of multiple existing drugs, but also discover new ones and then assess their effectiveness. It's the biggest potential disruption to healthcare we'll see in our lifetime.*

Dr. Alexander Zhavoronkov, Insilico Medicine, **Simone Fishburn,** BioCentury, and **Jonathan Tobin,** Brandon Capital, discuss the big disrupters to healthcare.

The possibilities are almost infinite given the existence of more molecules in the known universe than stars.[6] But finding the ones with the potential to benefit human health by changing the behavior of specific proteins in the body is a time-consuming process.

And it is one that has always been subject to a very high failure rate. Data shows that more than 90% of all clinical drug development fails.[7]

AI's ability to analyze huge datasets and its modelling capabilities are starting to change this, turbocharging drug discovery. Quantum computing may then take this to the next level since it adheres to the same principles of quantum mechanics that all living matter is subject to.

Dual purpose therapeutics

Jonathan Tobin, a partner at Australian life science venture capital firm Brandon Capital, believes the biggest investment opportunities within the healthcare sector lie in discovering new molecules and the novel mechanisms of disease.

For Dr. Zhavoronkov, this means dual-purpose therapeutics, which simultaneously target the fundamental pathways of disease and aging. His company uses generative AI to find them and is currently in the process of developing a drug candidate for idiopathic pulmonary fibrosis, an age-related lung disease with an average age of onset around 65.[8] Phase 2a clinical trials in China were completed in September 2024.[9]

Perhaps the most famous example of a dual-purpose therapeutic is glucagon-like-peptide-1 (GLP-1) receptor agonist drugs, which were originally developed to treat diabetes but are now used to tackle obesity.

As Tobin reflects:

> *"Five years ago, obesity wasn't even considered a disease. Yet now, we can potentially eradicate it, plus all the complications and age-related diseases that stem from it.*

Jonathan Tobin, Brandon Capital, chews the fat on GLP-1.

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For Tobin, GLP-1 drugs are having the same transformative effect that vaccinations and antibiotics did when they were first introduced. BofA Global Research has also evaluated the downstream effects of broad adoption.

It predicts less snacking and less unhealthy food and alcohol consumption, thanks to lowered appetite and reduced cravings, plus a positive impact on the apparel retail sector as consumers replace their wardrobes with smaller sizes.

Neurological diseases

Brandon Capital's Tobin also notes that age-related neurological diseases such as Alzheimer's and dementia are generating a lot of investment interest. He highlights one investment in a UK-based startup that is investigating how to boost glymphatic flow within the brain — the clearance of toxins and memory consolidation that occurs during deep sleep. This weakens as neurodegenerative diseases progress.

Dr. Simone Fishburn, editor-in-chief of analytics company BioCentury, agrees that neuroscience is a huge focus of investment.

She comments:

> *"I've been saying that it's about to take off for about 25 years. But now it really is.*

One of the biggest challenges has been developing drugs able to cross the blood/brain barrier. "We're starting to see some breakthrough technologies enabling this," she continues. "It will open up the whole panoply of therapeutic modalities that can be used in treating central nervous system diseases."

Dr. Simone Fishburn, BioCentury, outlines a point.

Cellular aging

Another target for longevity medicine is cellular rejuvenation — prompting cells to revert to their younger state — and developing drugs that remove older senescent cells, which have not died and may be damaging younger cells around them, contributing to age-related conditions.

One target is another potential dual-purpose therapeutic, metformin, which has been authorized to treat diabetes since the mid 1990s.[10] A 2024 study published by researchers at the Chinese Academy of Sciences in *Cell* demonstrated its anti-aging effects on monkeys.[11] They discovered that metformin not only slowed down age-related indicators such as inflammation, fibrosis and cell death, but also had geroprotective effects such as enhancing cognitive abilities and DNA repair.

Dr. Zhavoronkov views cell and gene therapies as extremely effective and promising therapeutics. "Gene editing and the prospect of genetically modified cells being put back in the body are at the very frontier of longevity medicine," he remarks. "We see massive disruption in this space, but the initial market will be small due to the high costs involved."

In the meantime, a number of studies show that the psychology of aging is also important. A landmark study by Dr. Becca Levy at Yale University found that people who had more positive perceptions of aging lived an average 7.5 years longer than those who did not.[12] Or, as the famous quote once put it: "Age is an issue of mind over matter."

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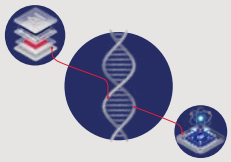

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