



FUTURE OF LONGEVITY

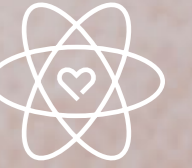
INNOVATION
CENTRE
DENMARK

FUTURE OF LONGEVITY

Cases from Silicon Valley
in extending healthy lifespan
opportunities & challenges



INNOVATION
CENTRE
DENMARK



FOREWORDS

INNOVATION CENTRE DENMARK SILICON VALLEY

Welcome to an exploration of the transformative potential of longevity! As the global conversation shifts toward longer, healthier lives, the imperative to understand and adapt to this change has never been more evident. This publication delves into longevity from three different angles - Scientific, Personal & Societal.

Join us on a journey through pioneering innovations and forward-thinking strategies inspired by Silicon Valley's dynamic ecosystem. Longevity is not only about adding years to life but ensuring those years are meaningful, healthy, and equitable. The cases presented in this publication offer insights into groundbreaking advancements, individual empowerment through health technologies, and the systemic shifts required to embrace a world where living beyond 100 years becomes a reality.

The three angles of longevity are examined individually, yet the challenge lies in the interconnectedness of these dimensions. Scientific breakthroughs inform personal health strategies, while societal adaptations create the frameworks that enable these advancements to benefit everyone. As policymakers, business leaders, and individuals navigate this new terrain, the complexity of balancing scientific innovation, accessibility, and inclusivity becomes increasingly apparent.

Over the past year, Innovation Centre Denmark in Silicon Valley has engaged with thought leaders, innovators, and businesses at the forefront of the longevity revolution. While there is no universal consensus to challenges posed by extended lifespans, the insights shared here aim to inspire reflection and dialogue among those shaping the future of health and aging.

We extend our sincere gratitude to all contributors who have made this exploration into longevity possible. We invite you to engage with us further as we continue to connect Denmark and Silicon Valley in shaping a shared vision for a healthier, longer future for all.

TABLE OF CONTENTS

Foreword	4
Executive Summary	6
The Longevity Imperative	7
Scientific Longevity	9
Case 1 - Altos Labs	11
Case 2 - Calico Life Sciences	13
Case 3 - BioAge Labs	15
Case 4 - Retro Biosciences	17
Personal Longevity	19
Case 5 - Function Health	21
Case 6 - Levels Health	23
Case 7 - Apple Accessories	25
Case 8 - Human Longevity INC	27
Societal Longevity	29
Case 9 - Stanford Centre on Longevity	31
Case 10 - R42 Institute	33
Case 11 - Conboy Labs	35
Case 12 - Prenuvo	37
Concluding Remarks	39
Thank you	41
Sources for further context	41

INNOVATION CENTRE DENMARK



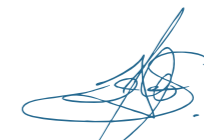
Jesper Kamp
CEO & Consul General



Allan Skårup Kristensen
Science & Innovation Attache



Anders Christjansen
Sector Expert & Sr. Advisor,
Executives & Boards



Jon Therkildsen
Sr. Advisor, Health

DANSK ERHVERV SUNDHED OG LIFE SCIENCE

Over the years, Dansk Erhverv has collaborated closely with Innovation Centre Denmark to strengthen ties between Danish businesses and the innovative ecosystem of Silicon Valley. This partnership has offered invaluable insights into emerging trends and transformative ideas, helping Danish companies remain competitive in an ever-evolving global landscape.

The subject of longevity, as explored in this publication, *The Future of Longevity*, is of profound importance to both Danish life sciences and society at large. The insights shared here, inspired by Silicon Valley's pioneering advancements, encourage us to reflect on how industries can adapt to a world where longer, healthier lives are increasingly shaping societal and economic structures.

We believe this publication will spark meaningful discussions and inspire Danish businesses and policymakers to consider the opportunities and challenges posed by healthy extended lifespans. By working together, we can leverage these insights to shape a sustainable and inclusive future that benefits all facets of society.

R42 INSTITUTE

Longevity is reshaping how we address health and disease—it is redefining the way we live, thrive, and contribute to the fabric of society. *The Future of Longevity* captures the essence of groundbreaking innovations emerging out of Silicon Valley, a place where bold ideas consistently transform into realities that shape our world.

Through the years of collaboration with Innovation Centre Denmark, I have witnessed the potential of uniting Danish ingenuity with Silicon Valley's dynamic ecosystem.

This publication is more than a collection of case studies—it is a call to action, an invitation to engage, inspire, and lead the critical conversations that will define our shared future. My hope is that it fuels a sense of purpose and drives us to stay at the forefront of this transformative movement.

DANSK
ERHVERV



Katrina Feilberg Schouenborg
Industry Director, Health and Life Sciences
Dansk Erhverv /Danish Chamber
of Commerce

R42

Dr. Ronjon Nag
Adjunct Prof. in Genetics at
Stanford University, School of
Medicine & Founder of R42

EXECUTIVE SUMMARY

In an era defined by rapid advancements in science and technology, this publication explores the transformative potential of longevity. As humanity moves closer to a future where living beyond 100 years becomes the norm, the focus shifts from merely adding years to life to ensuring those years are healthy, meaningful, and accessible to all.

Longevity is no longer just a scientific aspiration but a societal challenge and opportunity. Across the fields of scientific discovery, personal health decisions, and systemic societal adaptations, this publication examines how individuals, businesses, and communities can embrace the possibilities of extended lifespans. By integrating innovation and policy, the longevity revolution promises to reshape not only healthcare but also education, work, and social structures, paving the way for a future where longer lives are well-lived.

This publication addresses three key dimensions of longevity. The first section focuses on **Scientific Longevity**, highlighting advancements in biotechnology and genomics that are redefining our understanding of aging. These efforts aim to transition from reactive treatments to preventive and regenerative approaches, accelerating the journey toward healthier aging.

The second section, **Personal Longevity**, emphasizes how individuals are empowered to take control of their health through accessible tools and technologies. From personalized health monitoring to preventive strategies, this area explores the growing shift toward proactive health management that allows people to make informed decisions to extend their healthspan.

The third section, **Societal Longevity**, delves into the systemic changes required to support longer lives. As lifespans extend, the need for reimagining healthcare, education, and community engagement becomes paramount. This section reflects on how societies can balance incremental improvements with transformative shifts to ensure longevity benefits are shared equitably.

Throughout the publication, the interconnectedness of these dimensions becomes clear. Scientific breakthroughs inform personal health strategies, while societal adaptations create the frameworks needed to support longer, healthier lives. Together, these efforts reflect the growing recognition that longevity is not just about medical advancements but about rethinking the structures and systems that shape our lives.

In conclusion, this publication offers a starting point for understanding the complexities and opportunities of the longevity revolution. By reflecting on these strategies, individuals, businesses, and policymakers can engage in meaningful discussions and take inspiration for shaping a future where longevity is not only achievable but also enriching and inclusive for all.

THE LONGEVITY IMPERATIVE

The way we live, age, and plan for the future is undergoing a profound transformation. Longevity, the ability to live longer and healthier lives, is emerging as a central theme in today's discourse, captivating the interest of scientists, individuals, and policymakers alike. With advances in technology, healthcare, and societal structures, the question is no longer whether we can live longer but how we can do so meaningfully and equitably.

Seconds of Insight

Longevity: Refers to the extension of both lifespan and healthspan—the time individuals remain healthy, active, and independent. It encompasses scientific breakthroughs, personal health optimization, and societal adaptations to ensure quality of life - through all of life.

So, why is longevity suddenly a major topic of interest? From the scientific perspective, breakthroughs in biotechnology and genomics offer the potential to prevent diseases like cancer, Alzheimer's, and cardiovascular disorders before they manifest. This shift from reactive treatments to preventive and regenerative healthcare represents a fundamental evolution in medicine, promising not just longer lives but healthier ones. On a personal level, the rise of health monitoring tools and personalized wellness strategies has empowered individuals to take control of their health. From tracking vital signs to adopting preventive measures, people are more invested than ever in staying healthy and fit for as long as possible. This desire for autonomy over one's health has driven demand for innovations that make longevity accessible to the masses. From a societal perspective, healthier, longer lives can alleviate some of the financial and logistical burdens associated with aging populations. Reduced hospital admissions, lower costs for personal care, and decreased dependency on government subsidies can result in significant savings and greater economic stability. Longevity thus has the potential to transform not just individuals but entire communities and nations.

Why Is Longevity Relevant Now?

Longevity has captured the attention of influential stakeholders across the board, from Silicon Valley tech moguls to policymakers. Big Tech and wealthy investors are some of the most vocal advocates, funding cutting-edge research and setting the pace for innovation. The growing attention stems from an increasing realization that longevity may provide a fundamental perspective for addressing the challenges of an aging population: by reshaping the relationship between biological age and chronological age, paving the way for radical new ways of living. This, combined with the fact that many ideas once seen as fantastical or even wishful thinking are now supported by increasingly convincing evidence, is advancing the topic on to the entrepreneurial stage.

However, this raises questions beyond the fundamental ideas: Is longevity becoming a privilege for the rich, or can its benefits be extended to all? As interest in the field grows, it is essential to address the potential for inequality and ensure that these advancements benefit society at large.

Seconds of Insight

Longevity span: Longevity spans a broad spectrum of areas, including scientific discovery, personal health management, and systemic societal change. It encompasses efforts to understand and cure aging, tools and technologies that enable individuals to optimize their health, and policy frameworks designed to adapt societal structures to longer lifespans.

MAIN PERSPECTIVES AND CASE OVERVIEW

This publication is structured into three sections, each addressing a distinct dimension and outlook on longevity. The overview below serves as a reference guide to the case studies, highlighting their interconnected perspectives within their respective sections.

SCIENTIFIC LONGEVITY

This section delves into some of the more groundbreaking advancements in biotechnology and genomics emerging from Silicon Valley. By focusing on understanding and potentially reversing the mechanisms of aging, the section highlights the scientific innovations fueling the longevity landscape.



- CASE 1: Altos Labs**
> Preventing Age-Related Diseases
- CASE 2: Calico Life Sciences**
> Controlling Aging Biology
- CASE 3: BioAge Labs**
> Anti-Aging Therapies
- CASE 4: Retro Biosciences**
> Aging Reversal Drugs

PERSONAL LONGEVITY

Here, we explore cases for how individuals can make informed decisions to extend their healthspan. From personalized health monitoring to preventive care strategies, this section examines the tools and technologies empowering people to take charge of their well-being.



- CASE 5: Function Health**
> Biomarker Monitoring
- CASE 6: Levels Health**
> Glucose Monitoring
- CASE 7: Apple Accessories**
> Human Monitoring
- CASE 8: Human Longevity**
> Ailment Monitoring

SOCIETAL LONGEVITY

The final section addresses the systemic changes required to adapt to longer lives, and cases relevant to this perspective. These consider how healthcare, education, and community structures must evolve to ensure that the benefits of longevity are equitably shared and contribute to a thriving society.



- CASE 9: Stanford Centre on Longevity**
> Map Of Life
- CASE 10: R42 Institute**
> Grassroots Movement
- CASE 11: Conboy Labs**
> Blood Comes First
- CASE 12: Prenuvo**
> Old Tech. New Vision.

In a world where longer lifespans are becoming a reality, this publication invites you to reflect on the implications of this shift. By exploring scientific breakthroughs, personal health strategies, and societal adaptations, we aim to inspire meaningful conversations and actions that will shape the future of longevity. Together, we can navigate this transformative journey and ensure that extended lifespans lead to better lives for all.

SCIENTIFIC LONGEVITY

Aging is an intrinsic part of the human condition, a biological process that, despite centuries of scientific inquiry, remains imperfectly understood. Yet, as the global population grows older and the societal and economic implications of aging come into sharper focus, a bold new frontier has emerged: Longevity Science. With billions of dollars now pouring into the sector, particularly from venture capital firms rooted in Silicon Valley's tech ecosystem, the question arises: where exactly are these investments being directed? Are they aimed at deepening our understanding of aging, or are they focused on solving it - unlocking the secrets to living longer, healthier lives?

This surge in funding has propelled longevity from a niche area of research into a thriving industry. Silicon Valley, long associated with technological disruption, is becoming a hub for ambitious efforts to tackle aging. Visionary investors and entrepreneurs are betting on the possibility that aging can be reframed as a problem to be solved rather than an inevitability to be accepted. As these investments grow, so too does the diversity of scientific focus. Some companies aim to uncover the fundamental mechanisms that drive aging, while others are laser-focused on translating these discoveries into therapies that could extend the human lifespan.

The Driving Forces Behind Longevity Investments

The influx of venture capital into longevity science is driven by a combination of technological breakthroughs, demographic trends, and visionary leadership. What was once a field dominated by academic researchers has now attracted some of the world's most influential investors and tech entrepreneurs. Silicon Valley's culture of bold, high-risk investment is shaping this nascent industry, enabling companies to pursue ambitious goals that could redefine what it means to age.

One of the most intriguing aspects of this movement is the range of approaches being funded. Some companies, like Altos Labs, are delving into cellular rejuvenation, inspired by Nobel Prize-winning research that suggests aging can be reversed at the cellular level. Others, like Calico Life Sciences, are focused on the long-term understanding of aging biology, emphasizing foundational research that could take decades to bear fruit. Meanwhile, companies like BioAge Labs and Retro Biosciences are exploring more data-driven and preventive strategies, leveraging cutting-edge technologies to identify actionable targets for extending healthspan.

A Question of Focus: Understanding or Solving Aging?

As investments flow into the longevity sector, a key question emerges: is the focus on understanding aging, or on curing it? Companies like Calico exemplify the drive to expand scientific knowledge, prioritizing the study

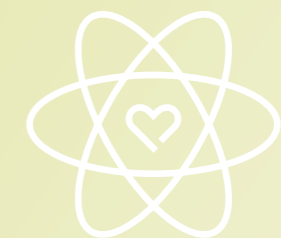
of aging's biological underpinnings over immediate applications. By contrast, firms like BioAge Labs and Retro Biosciences are oriented toward action, aiming to develop therapies that directly address the causes of aging and extend healthy lifespan.

This dual focus - on understanding and solving aging - reflects the complexity of the challenge. Altos Labs, for instance, represents a blend of these ambitions, with its work straddling fundamental research and the development of cellular rejuvenation therapies. The diversity of approaches underscores the uncertainty of the field: it is not yet clear whether the key to longevity lies in unraveling its mysteries or in devising effective interventions.

Challenges and Opportunities

Despite the optimism surrounding these investments, significant challenges remain. Scientific progress in longevity is inherently uncertain, and the translation of laboratory findings into safe, effective therapies for humans will require rigorous research, clinical trials, and regulatory approval. Moreover, ethical questions loom large. Who will benefit from these advances? Will they be accessible to all, or restricted to the wealthy few who can afford cutting-edge therapies?

Nonetheless, the momentum is undeniable. The convergence of visionary leadership, groundbreaking science, and unprecedented funding has positioned longevity as one of the most exciting frontiers in both biotechnology and venture capital. As we explore the work of Altos Labs, Calico Life Sciences, BioAge Labs, and Retro Biosciences, this section aims to shed light on the critical question: where are the investments going, and what is the scientific focus? Are we closer to understanding aging, curing it, or perhaps both?



SCIENCE FICTION WITHOUT FICTION

How Altos Labs Aim to Turn Back the Clock on Cellular Aging

CASE 1 Altos Labs



Biotech startups are emerging worldwide with a common goal: redefining aging and extending healthy human lifespans. At the forefront of this pursuit is Altos Labs, a Silicon Valley-based biotechnology company that stands out as one of the most remarkable startups in modern history. With substantial financial backing and a team of exceptionally experienced, award-winning experts (hereunder several Nobel Prize laureates), Altos Labs is dedicated to this ambitious mission. But are they on the verge of a revolutionary breakthrough in human longevity, or are they chasing an illusion fueled by billionaire dreams of extended youth?

Altos Labs was founded in Los Altos in 2021 by biotech industry veterans Rick Klausner and Hans Bishop. What sets Altos Labs apart is its pioneering approach to aging: focusing on preventing age-related diseases before they manifest, rather than treating them after onset. This proactive strategy positions Altos Labs as a potential **game-changer** in the biotech industry.

Altos Labs' research centers are dedicated to exploring methods for turning older, more fragile cells into younger, more resilient ones. Achieving this breakthrough could potentially prevent many age-related diseases, such as Alzheimer's, cancer, and cardiovascular disorders, which are major causes of death and reduced quality of life in the elderly. Their work builds upon the groundbreaking 2006 discovery by Shinya Yamanaka, who successfully reprogrammed differentiated cells into induced pluripotent stem cells (iPSCs) using what are now known as the Yamanaka Factors. Yamanaka, who was awarded the Nobel Prize for his research, now serves as a Senior Scientific Advisor at Altos Labs.

Another key figure at Altos Labs is Juan Carlos Izpisua Belmonte, a Founding Scientist and Director of the San Diego Institute of Science. Belmonte is renowned for his work in regenerative medicine, particularly in rejuvenating and reprogramming older or diseased cells. His research extends Yamanaka's findings, demonstrating that partial cell reprogramming can enhance cellular resilience against stress, dysfunction, and injury without reverting to a full stem cell state. If this can be achieved in humans, the healthy lifespan could be extended substantially, significantly improving the quality of life for billions of people.

"We now have pre-clinical data suggesting that the cellular dysfunction associated with aging and disease can be reversible. This knowledge means that it may, one day, be possible to transform patients' lives by reversing disease, injury and the disabilities that can occur throughout life."

Dr. Hal Barron, CEO of Altos Labs

Altos Labs stands out not only for its scientific competence but also for its financial backing. The company launched with an initial funding of more than **\$3 billion**, making it one of the **best-funded companies on the global scene** - across any vertical. Notable investors include Amazon founder Jeff Bezos, Israeli tech investor Yuri Milner (founder of DST Global), and life science investor Arch Venture Partners. This substantial support underscores the confidence in Altos Labs' mission to revolutionize cellular rejuvenation and anti-aging research.

The combination of scientific expertise and robust financial backing equips Altos Labs to pursue its ambitious goal of prolonging healthy human lifespans. However, the path ahead is not without challenges. Altos Labs must navigate numerous uncertainties in developing safe and effective therapies. Obtaining regulatory approval from governmental institutions worldwide will be crucial for the company to transition from research to commercialization and become a self-sustaining enterprise. Despite these hurdles, the expertise and resources at Altos Labs' disposal provide a promising foundation for potential breakthroughs in health and longevity. As the company continues its work, it may well be at the forefront of a new era in human health, where the boundaries of aging are redefined and the quality of life in later years is dramatically transformed.

Seconds of Insight

Cellular rejuvenation: The ageing process is a systemic decline from cellular dysfunction to organ degeneration, with more predisposition to deteriorated disorders. Rejuvenation refers to giving aged cells or organisms a reversal to an earlier stage - more youthful characteristics through various techniques, such as epigenetic regulation.

FROM CODE TO CURE

How Calico (Alphabet's Moonshot for Longevity) Unveils the Secrets of Aging

CASE 2 Calico Life Sciences



In the competitive landscape of biotechnology and health sciences, Calico Life Sciences stands out as a beacon of innovation, tackling one of humanity's most enduring challenges: How to live longer and healthier lives by unlocking a deeper, holistic understanding of biological aging. Backed by Alphabet, the parent company of Google, Calico is dedicated to unraveling the mysteries of aging and extending human healthspan. But can the fusion of technology and biology truly reshape the future of aging?

Founded in 2013, Calico was Alphabet's bold venture to explore aging and develop an understanding of how aging can be slowed or even reversed. The company's core mission is to explore the biology of aging and age-related diseases. Led by Arthur Levinson, a biochemist, former CEO of Genentech and the Chairman of the Board at Apple Inc., Calico combines academic rigor with the vast resources of Silicon Valley, making it uniquely positioned to tackle the complexities of aging.

At its core, Calico focuses on understanding the biological mechanisms that underpin aging, with the goal of translating these discoveries into real-world therapies. Unlike most companies, Calico isn't driven by short-term market gains. Instead, the company operates with a long-term vision, investing in fundamental research that could take decades to fully bear fruit. With Alphabet's substantial economical backing, Calico is empowered to push the boundaries of how we understand aging.

"We'd like to find ways for people to have a longer and healthier life. But by how much, and how - well, I don't know."

David Botstein, Former CSO of Calico

The cornerstone of Calico's longevity research is mapping the mechanisms of aging. By charting cellular changes over time, researchers are uncovering the biological pathways that drive aging, creating groundbreaking insights into potential interventions to slow or even reverse the process. In collaboration with their strategic partner, AbbVie - one of the world's leading biomedical companies - Calico leads the research and early development while AbbVie contributes with scientific, clinical and commercial expertise.

"Our collaboration has evolved into an innovation engine, particularly for novel targets, that could break new ground for challenging age-related diseases."

Tom Hudson, M.D., Sr. VP R&D & CSO of AbbVie

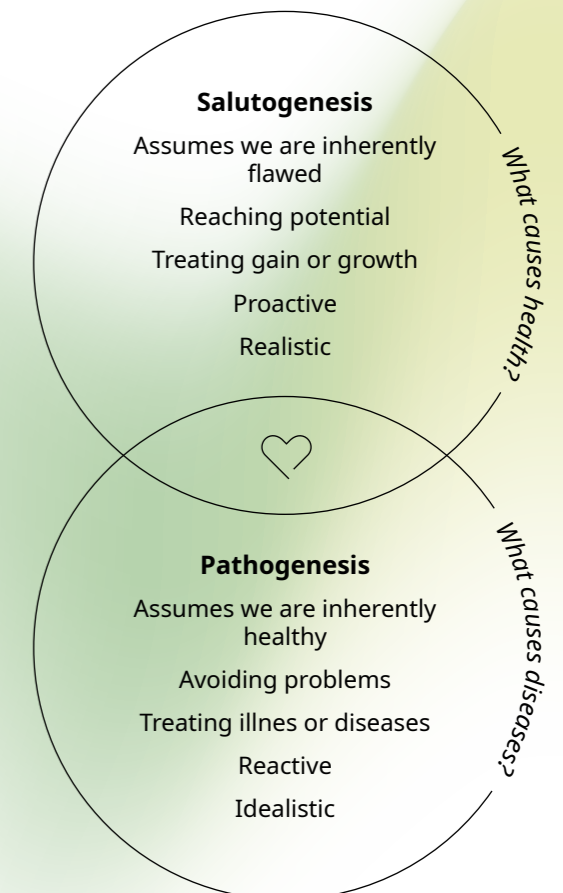
Calico's research has revealed that while some cells activate protective genes to delay aging, others degrade rapidly during life. This variability helps explain why age-related diseases, such as Alzheimer's, cardiovascular

diseases, and cancer, manifest differently across sexes and individuals. By mapping how aging unfolds at the cellular level, Calico aims to identify key molecular pathways that can be targeted to delay the onset of aging. This proactive approach goes beyond treating diseases as they arise; it seeks to prevent them by maintaining cellular health over a longer period, thereby extending the healthy lifespan. By doing so, Calico touches on one of the core paradigmatic elements of how to fight disease, namely the transition from pathogenesis to salutogenesis.

By uncovering the molecular mechanisms of aging, Calico is laying the groundwork for treatments that could not only slow but possibly reverse aging, signaling a major shift in how we approach age-related diseases and the processes of aging.

However, there are still significant challenges ahead. While Calico has made impressive strides in understanding the biology of aging, translating these discoveries into safe and effective therapies for humans will require years, if not decades, of continued research and development.

Nonetheless, Calico's work offers a glimpse into a future where aging is no longer seen as an inevitable decline but as a process that can be studied, understood, and ultimately altered. With the backing of Alphabet, Calico is not only pushing the boundaries of scientific discovery but actively transforming those insights into real-world applications. Their vision extends beyond research, seeking to redefine aging itself through innovative therapies that could fundamentally reshape what it means to grow old.



FROM AGING TO ACTION

How BioAge Use Therapeutic Tools to Halt the Aging Processes

CASE 3 BioAge Labs



In the quest to unlock the secrets of longevity, BioAge Labs emerges as a disrupter of innovation in Silicon Valley's bustling biotech and pharma landscape. As the global population ages, the pressing need to extend healthspan has never been more critical. BioAge Labs is on a daring mission to stop aging before it ever starts. But is BioAge's human-first model the key to unlock the secrets of longevity, or is it merely another promising yet uncertain path in humanity's race to avoid disease?

Nestled in Richmond, California, BioAge stands out among its peers in the biotech sector, by leveraging a unique human-first, data-driven approach to combat aging. Led by CEO Kristen Fortney, Ph.D. in Medical Biophysics and postdoctoral researcher at Stanford University, the company aims to transform how we perceive and tackle the aging process. Rather than addressing diseases as they occur, BioAge seeks to identify and target the molecular mechanisms that drive aging, effectively intervening before age-related diseases arise.

What distinguishes BioAge is not only their bold mission to decouple aging from illness and debilitation, aiming to extend healthy human lifespan, but also the substantial financial backing they have secured from top-tier Silicon Valley venture capitalists during a time when most health investments were in decline. In 2024, the company secured a remarkable \$170 million investment from **Andreessen Horowitz**, a household name in Silicon Valley, known for backing tech giants like Facebook, Airbnb, and Lyft. Among previous investors are **Khosla Ventures**, a leading Venture Capital in Silicon Valley known for investing in disruptive technologies as Open AI, the world-renowned developer of ChatGPT. The substantial funding from leading investors underscores a growing confidence in BioAge's potential to revolutionize healthcare by addressing aging at its core. With nearly \$300 million in total funding, BioAge has positioned itself at the forefront of the longevity movement with a clear mission by directly targeting the biological processes that lead to aging.

BioAge believes that aging doesn't have to be synonymous with disease and disability. Instead, they envision a future where people live healthier, longer lives, free from the chronic conditions that typically accompany one as one ages. To achieve this, BioAge focuses on discovering therapies that slow, or even reverse, the biological processes that cause aging at a molecular level.

BioAge sets itself apart by utilizing artificial intelligence and machine learning to analyse vast amounts of biological data in their quest to uncover new therapeutic targets. The defining feature of BioAge's strategy is their data-driven, human-first approach where they base research on human longevity data, ensuring that the targets they discover will be directly relevant to human aging. Unlike competitors who rely heavily on animal models, BioAge's method positions them to develop preventive therapies that are more prone to succeed in human real-world applications. BioAge's data-driven

approach integrates decades of multi-omics data (multiple biological data combined for analysis) to identify the molecular mediators of aging. By harnessing the power of artificial intelligence and machine learning, BioAge can pinpoint potential drug targets more efficiently and accurately than traditional methods, allowing them to develop therapies that address the root biomarkers of age-related diseases. This advanced technology enables BioAge to uncover previously unknown pathways that contribute to metabolic aging. One such example is the development of **NLRP3** inhibitors, a therapy developed by BioAge that targets neuroinflammation, which is a key driver of diseases like Parkinson's and Alzheimer's. By developing these programs BioAge aims to not only extend lifespan but to ensure that those additional years are spent in productive health.

"In the near term, we believe that studying aging biology will give us new drugs for diseases where there's a high unmet need. Over the longer term, we will be unlocking ways to prevent diseases from arising in the first place."

Kristen Fortney, CEO of BioAge Labs

As BioAge continues to develop its pipeline of therapies, the question remains: Can their data-driven, human-first approach crack the secrets to longevity? While the company has made significant strides in understanding the molecular underpinnings of aging from a human-first perspective by utilizing AI and machine learning, the path ahead is still on the horizon. However, with the backing of Silicon Valley heavyweights like Andreessen Horowitz and Khosla Ventures, and a very solution-motivated approach, BioAge is well-positioned to lead the wave of innovation in the longevity sector. The real challenge will be translating their research into viable medical treatments that can be scaled globally. Whether or not BioAge can fully realize its mission remains to be seen, but one thing is clear: BioAge is set on making age —at all stages— medically manageable.

Seconds of Insight

Productive Health: Healthy aging is a state of well-being that encompasses multiple dimensions to ensure a fulfilling and purposeful life throughout the aging process, meaning one is active and productive in the economy for longer.

ANOTHER 10 HEALTHY YEARS TO LIFE IS WORTH \$180 MILLION

How Retro Biosciences and Sam Altman Aims to Reprogram Life



Seconds of Insight

Silicon Valley's Power Player: Sam Altman stands as one of Silicon Valley's most influential and maverick entrepreneurs, known for his bold ventures in the tech world. As the former president of Y Combinator, one of the world's most successful start-up accelerators, Altman has helped launch multiple tech Unicorns, including Airbnb and Dropbox.

In 2015, Altman and Elon Musk co-founded OpenAI, the ground-breaking artificial intelligence research lab behind ChatGPT. Under Altman's leadership, OpenAI has pushed the boundaries of Generative AI, making it accessible and relevant across industries all over the world.

CASE 4

Retro Biosciences

In April 2022, Sam Altman, best known for founding OpenAI and creating ChatGPT, made headlines with a record-breaking \$180 million investment in the San Francisco-based biotech start-up Retro Biosciences. With the investment, Altman joined the growing ranks of Silicon Valley tech moguls joining the mission of extending the human healthy lifespan. Retro Bio-sciences operates at the intersection of cutting-edge technology and biology, on a mission to extend healthy human lifespan by a declared 10 years. Altman's investment provides the necessary capital to advance Retro's research into cellular reprogramming and therapeutics. But can Retro Biosciences' vision truly unlock a new era in human health, or is it Altman's latest addition to the list of building utopian technologies?

Founded in 2020, Retro Biosciences aims to make ground-breaking advancements in cellular reprogramming and advanced therapeutics, positioning itself at the forefront of the longevity space in California. With a clear mission to extend the healthy human lifespan by 10 years, Retro Biosciences is driven by the vision of transforming the way we approach aging, shifting the focus from treating age-related diseases to preventing them at their source.

Led by CEO Joe Betts-LaCroix, the company focuses on developing therapies for diseases by targeting the fundamental biological processes that drive aging. This proactive and preventive strategy not only sets Retro Biosciences apart from traditional medical approaches but also positions the company as a potential game-changer in the global approach to treating disease.

"I grew up swimming in this idea of 'There's a new world we're creating, and it can be whatever we want, and it can be better.'"

Joe Betts-LaCroix, Founder & CEO of Retro Biosciences

Retro Biosciences operates around five core therapeutic programs, each designed to address a specific aspect of aging. The programs are targeting aging at its roots with the hope of not just extending life but avoiding most of the diseases that typically come with age.

One program is around **cellular reprogramming** where Retro Biosciences seek to reverse cellular damage and rejuvenate tissues. This revolutionary technique has the potential to turn back the biological clock, restoring the youthful functionality of cells and tissues. **Autophagy enhancement** is another pillar of Retro Biosciences' research, aiming to boost the body's natural ability to clear out damaged cells and regenerate healthy ones, helping to delay the onset of age, and age damage. Further, Retro Biosciences is pioneering **plasma-inspired therapeutics**, inclined by the rejuvenating effects of young blood. This research aims to improve cognitive function and slow down neurological decline in aging brains. The company is also developing **microglia therapeutics** to protect and revitalize the brain's immune cells, which play a critical role in warding off neurodegenerative diseases like Alzheimer's. Finally, tissue **reprogramming** focuses on genetic-level interventions to restore tissue vitality, addressing the root causes of age-related degeneration.

The substantial investment from Altman not only provides important funding but also elevates Retro Biosciences' profile in Silicon Valley's thriving longevity and biotech sector. Altman's involvement brings with it the attention and credibility that can attract additional investments and partnerships, enabling the company to accelerate its research and bring innovative therapies to market more quickly. As a leading figure in the tech world, Altman's endorsement signals a growing interest from Silicon Valley's elite. This trend has also been seen in other investments, such as Altos Labs, Calico Life Sciences, BioAge Labs, where other prominent world leading investors have poured significant funds into the mission of extending human healthy lifespan.

With Retro Biosciences and many more companies approaching the vision of longevity, Silicon Valley is not just a hub of innovation in digital technologies, but a growing epicentre of the longevity movement, where the dream of extending human life is non longer a mere fantastical statement, but a real possibility. Sam Altman's significant investment in Retro Biosciences reflects the trend in Silicon Valley, where technology and biotech are converging to push the boundaries of human healthy lifespan. Retro Biosciences' vision of adding 10 healthy years to human life hinges on the success of their research programs. Developing drug therapies that can safely and effectively reverse aging will require rigorous clinical trials, scientific validation, and eventual regulatory approval, experts say. However, with Altman's unprecedented investment and Retro Biosciences ground-breaking research and

development, the company is well-positioned to become a leader in the longevity field. As we look toward the future, the question is evidently no longer whether Retro Biosciences can eventually extend human lifespan, but by how much and how soon.

Seconds of Insight

Autophagy Enhancement: Autophagy is a vital process in which the body's cells "clean out" unnecessary or damaged components. This process decreases with aging. While it may be possible to induce autophagy, gaps remain in our understanding of the potential side effects.

Microglia Therapeutics: Microglia, the brain's immune cells, are found in the brain and spinal cord. Therapeutics targeting microglia aim to treat neurodegenerative diseases by reducing inflammation and clearing toxic proteins.

PERSONAL LONGEVITY

As the pursuit of longer, healthier lives accelerates, the responsibility for achieving longevity is increasingly shifting toward individuals. In this emerging landscape, the tools and technologies available to support personal decision-making play a crucial role. From continuous health monitoring to minimally invasive tests and one-time assessments, individuals now have access to a wide array of solutions designed to help them understand and improve their health, with an instant realtime flux of personalized data. But how accessible are these solutions, and do they truly empower people to make better choices for a longer, healthier life? This section explores this question, focusing on the scope of offerings from information to actionable initiatives.

The Rise of Proactive Health Management

Historically, healthcare has been reactive, addressing problems only after symptoms emerge. However, with advancements in technology and personalized health tools, a new paradigm is taking shape: proactive, decision-driven health management. This Personal Longevity section examines how Silicon Valley startups and tech giants are creating solutions that enable individuals to take control of their health and longevity, often outside traditional healthcare systems.

In Silicon Valley, the democratization of health data has become a central focus. Companies like Function Health, Levels Health, Human Longevity INC, and Apple are making it possible for individuals to engage with their health in new ways. Whether through regular biomarker tests, continuous glucose monitoring, or wearable devices that track heart health and detect irregularities, these solutions provide insights that were once only available in clinical settings. By empowering individuals with real-time data and actionable insights, these companies are fostering a cultural shift toward self-directed health management.

Information vs. Initiatives - a Spectrum of Accessibilities

The solutions offered in this space vary widely in accessibility and approach. Function Health provides frequent biomarker testing and personalized health insights, enabling individuals to monitor their health continuously. Human Longevity INC brings it a step up, and provides extraordinary rich information to the extraordinary wealthy. Levels Health focuses on metabolic health, giving users the tools to track and optimize their glucose levels in real time. Meanwhile, Apple integrates health monitoring seamlessly into daily life with devices like the Apple Watch and AirPods Pro, making preventive health more accessible to a broader audience.

These offerings highlight the spectrum of accessibility - from one-time tests that deliver a snapshot of health to continuous, real-time monitoring systems that support

ongoing decision-making. By providing a range of options, these companies cater to diverse needs and preferences, allowing individuals to engage with their health in ways that suit their lifestyles.

Barriers and Opportunities

Despite the growing availability of these tools, challenges remain. Cost and accessibility continue to be significant barriers for many individuals, raising questions about how these solutions can be scaled to reach broader demographics. Initiatives like Apple's partnerships with insurance providers to subsidize health-focused devices point to potential pathways for making these technologies more widely accessible.

Additionally, the effectiveness of these solutions depends on their ability to translate data into actionable insights. While technology offers unprecedented opportunities for health monitoring and prevention, the ultimate test lies in whether these tools can drive meaningful behavior change and measurable health improvements.

The Future of Individualized Longevity

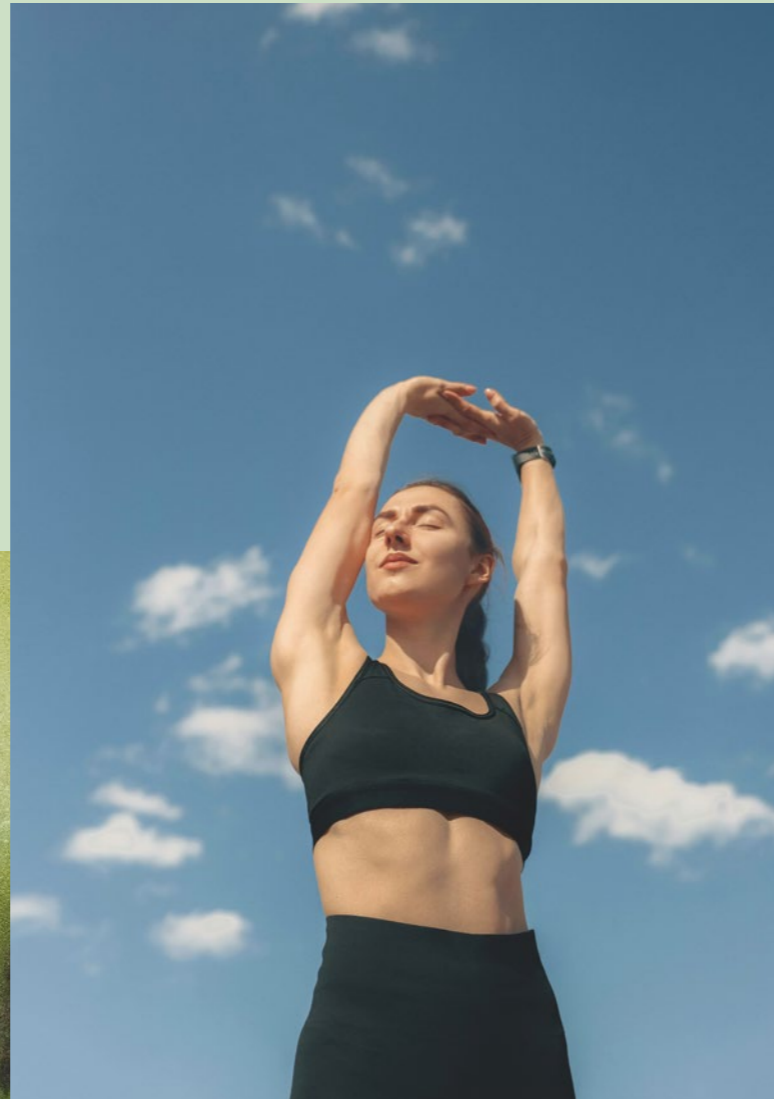
The convergence of technology, data, and personalized health insights is redefining how we think about longevity. In this section, we explore the cases of Function Health, Levels Health, Human Longevity INC and Apple's health-focused tech and wearables to illuminate how these innovations are putting the power of longevity into the hands of individuals. Are these tools truly accessible and effective in supporting life decisions for better health outcomes, or do they fall short of their promise? By examining the spectrum of solutions, from information to actionable initiatives, this section aims to uncover the evolving role of individual agency in the quest for a longer, healthier life.



FROM REACTIVE TO PROACTIVE

How Function Health is Using Biomarkers to Guide Personal Health

CASE 5 Function Health



Across industries, technology is driving change, and healthcare is no exception. In Silicon Valley, Function Health is leading the way in shifting healthcare from a reactive model to one focused on prevention and early diagnosis. With their innovative approach, Function Health aims to extend not just human life, but increasing healthy lifespan. But are they truly reshaping how we approach aging, or are they simply offering an ambitious yet unproven alternative to traditional care?

Founded in 2022, Function Health has quickly established itself as a frontrunner in the movement towards preventive health. Led by CEO and Co-Founder Jonathan Swerdin, the company has grown rapidly, with a clear vision of changing healthcare through detailed biomarker analysis and continuous health monitoring. Their approach is rooted in frequent testing and early detection, ensuring individuals are empowered to take control of their health before diseases arise.

“Function Health is the first with a mission of empowering you to live 100 healthy years ... Function isn’t just a company; it’s a movement of people of all ages taking control of their health. We’re at a historical juncture where technology and culture are converging to redefine our relationship with our own biology.”

Jonathan Swerdlin, Co-Founder & CEO of Function Health

The company’s rapid growth speaks to its success. With nearly 50,000 paying members and a waitlist of over 200,000 within its first years, Function Health is not just a promising startup: it’s rapidly becoming a key player in the longevity sector in Silicon Valley. Its \$53 million Series A funding round in 2024 was led by **Andreessen Horowitz**, one of the most influential and renowned venture capital firms in Silicon Valley, known for backing transformational tech companies like **Airbnb**, **Facebook** and **Twitter (now X)**. The investment round valued Function Health at \$184 million dollars, a testament to the firm’s confidence in the business model and its potential to drive future growth. Andreessen Horowitz’s involvement signals that Function Health isn’t just another longevity startup, but one with the capacity to fundamentally reshape how we approach preventive healthcare.

At the core of Function Health’s business model is an annual membership priced at \$499, which provides **over 100 lab tests per year**, personalized health insights from medical professionals, and access to a secure platform where users can track their health data over time. Members can opt for additional follow-up tests every 3-6 months, offering a continuous picture of their overall health. The tests cover a wide range of health indicators, from heart health to cancer screening, all tailored to the individual’s needs based on biomarker data.

Function Health’s approach is groundbreaking because it moves beyond the traditional model of healthcare, which typically reacts to symptoms from existing conditions. Instead, the company emphasizes prevention and early intervention. By continuously tracking biomarkers and offering personalized recommendations based on personal results, Function Health aims to catch potential health issues before they appear and become a concern, thereby improving the healthy lifespan as default. The integration of advanced health tech tools allows users to engage with their health in a more proactive manner, helping to shift healthcare from a reactive model to a proactive and preventive prophylaxis approach.

Function Health’s contribution to the growing longevity sector is undeniable and the road ahead is promising but not without challenges. As competition in the longevity and health tech sector’s intensifies, Function Health will need to continue proving that its approach can deliver long-term results. The question of whether Function Health can truly extend healthy lifespan and enable people to live 100 years depends on more than their mere efforts. It will require continued advancements in both their technology and broader developments in society. However, with substantial support from Andreessen Horowitz and their deep integration of advanced biomarker technology, Function Health is poised to play a key part in the longevity consumer-sector, showcasing the potential when technology, data, and personalized health insights converge to transform how we live and age, and how we are sick. Their strategic vision and innovative aggressive solution put them in a front runner role within Silicon Valley’s rapidly evolving longevity tech sector.

EMPOWERING INDIVIDUALS WITH REAL-TIME DATA

How Levels Health Use Glucose Monitoring In Driving Health Optimization and Longevity

CASE 6 Levels Health



The quest for longer, healthier lives has taken a major step forward with the rise of personalized health tracking technologies. Among the companies leading this charge is Levels Health, a platform that uses continuous glucose monitoring (CGM) to provide real-time health insights. With \$67 million in funding from major investors like Andreessen Horowitz and Long Journey Ventures, Levels is not only making glucose tracking accessible but is also transforming how individuals approach their overall metabolic health and longevity.

In a healthcare landscape traditionally centered on clinical visits and top-down advice, Levels Health marks a shift toward individual empowerment. Rather than waiting for an annual check-up, users of the Levels app have instant, actionable insights. This access to real-time data empowers users to make informed health decisions every day, driving a cultural shift towards preventive health.

“Trends over time are what matters. Your body is remarkably adaptable. It knows how to use hormones like insulin to deal with a glucose spike or antioxidants to fight the damage from a fructose-filled soda”.

Dr. Casey Means, Co-founder and CMO of Levels Health

Metabolic health is fundamental to longevity, as it influences risks for conditions like diabetes, cardiovascular disease, and neurodegenerative disorders. Levels Health equips users with tools to monitor their glucose levels, offering high quality real-time insights that show how dietary choices, exercise, and sleep impact their bodies. This continuous stream of data can highlight patterns and assist users in avoiding glucose spikes that could lead to insulin resistance and metabolic and more severe complications.

With a **CGM**, Levels Health users can see the direct effects of foods and activities on their glucose levels, enabling them to make lifestyle adjustments that promote stable blood sugar levels. This supports not only immediate well-being but also long-term health and resilience.

Traditional healthcare often involves reactive treatment rather than preventive care. With the Levels Health’s platform, users are encouraged to approach their health proactively. The app’s **personalized insights** allow individuals to adjust their behavior in real time, stabilizing blood sugar levels and supporting their metabolic health.

For instance, Levels Health provides users with data on how sleep quality impacts glucose levels, helping them identify behaviors that contribute to daily fatigue or energy crashes. It’s these personalized insights that help users navigate the nuances of their health. Rather

than simply tracking glucose, Levels Health integrates data from users’ meals, sleep, and exercise to paint a comprehensive picture of metabolic and overall health.

Levels Health has raised \$67 million to date, including a recent \$10 million funding round. This investment supports the company’s mission to broaden its reach and advance the platform’s functionality, positioning Levels Health as a frontrunner in the metabolic health market. The capital will also enable Levels Health to further its ongoing studies in partnerships with leading research institutions, expanding the understanding of glucose patterns across diverse demographics.

The latest round, backed by investors like Andreessen Horowitz, underscores a growing interest in health technologies that empower individuals to take control of their wellness journey. As the demand for user-centered health data rises, Levels Health is well-positioned to drive that shift, making healthcare more accessible and personalized.

Levels Health is creating a roadmap for a new kind of healthcare — one where individuals can access critical health data without waiting for a doctor’s appointment. By focusing on **metabolic health**, Levels Health is tapping into a powerful lever for promoting longer, healthier lives. Their success in the market is likely to inspire further innovations and investments in personalized health technology, highlighting the importance of real-time health monitoring in the quest for longevity.

As real-time data becomes a pillar of personal health management, Levels Health stands as a prime example of how technology can democratize access to real-time critical health information, and give power back to the user.

Seconds of Insight

Personal Foundation: While scientific and technological innovations continue to play a key role in health management, longevity inherently builds on quality sleep, regular exercise, a healthy diet, and effective stress management. Monitoring and timing these personal factors remain crucial and center to unlocking the full biological potential.

A HAPPY SIDE-EFFECT

How Apple's Wearable Empower Individuals to Take Control of Their Health and Extend Their Lifespan

CASE 7 Apple Accessories



In an era where technology intertwines seamlessly with daily life, Apple's innovations are setting new standards in personal health management. Beyond its renowned smartphones and computers, Apple has ventured into health-focused wearables, notably the **Apple Watch** and **AirPods Pro**, each playing a pivotal role in promoting healthy aging and longevity. This transition marks Apple's strategy of giving users direct access to high-quality health data that, until recently, required doctor visits, fostering a trend of individual empowerment.

The Apple Watch has evolved into a comprehensive health monitoring device, offering features that empower users to take proactive control of their well-being. It continuously tracks heart rate, detects irregular rhythms, and can even call emergency services in case of a fall. These capabilities allow for early detection of health issues, which is key to promoting longer, healthier lives.

One of the most powerful features of the Apple Watch is its ability to monitor heart health. It continuously tracks heart rate and sends notifications if it detects irregularities, such as abnormally high or low heart rates. The built-in electrocardiography (ECG) app helps identify atrial fibrillation (AFib), a condition that can lead to stroke if undetected. Early detection of heart issues is crucial for preventing serious complications, making this feature vital for longevity.

Falls are a major concern for older adults, but Apple has found a way to make elderly users feel safer. The Apple Watch's fall detection feature automatically detects hard falls and sends an alert to emergency services if the user is unresponsive. This feature enhances safety, offering peace of mind and immediate assistance in case of an accident, which helps prevent serious injuries that could impact life expectancy.

Additionally, Apple's AFib History feature tracks how often users experience atrial fibrillation episodes, providing insights into how lifestyle factors such as exercise and sleep impact their heart health. This long-term monitoring allows users to manage their conditions more effectively, reducing risks and contributing to a longer, healthier life.

Continuous health monitoring is particularly beneficial for older adults. Features like heart rate notifications, ECG monitoring, and fall detection enable them to maintain independence while closely monitoring their health. The Apple Watch also offers detailed medication reminders, ensuring users take their medication on schedule and in the correct dosage. It can even track menstrual cycles, offering valuable insights into reproductive health and potential irregularities. Personalized fitness goals encourage users to stay active, which is essential for maintaining cardiovascular health and overall well-being as they age.

Despite its benefits, one of the challenges of the Apple Watch is its cost, which may limit accessibility for lower-income individuals. Expanding availability through

healthcare subsidies or insurance programs could help democratize the benefits of this health technology. Recognizing this issue, Apple has partnered with major health plans like UnitedHealthcare and Aetna to offer subsidized Apple Watches to members, a move that benefits both users and healthcare providers by encouraging health monitoring.

Building on its commitment to health, Apple has introduced groundbreaking hearing health features in the AirPods Pro. These wireless earbuds now offer a comprehensive hearing health experience, including a Hearing Test, **Hearing Aid** functionality, and active Hearing Protection. This integration transforms the AirPods Pro into a valuable tool for individuals with mild to moderate hearing loss, providing accessible and personalized hearing assistance.

The Hearing Test allows users to assess their hearing capabilities conveniently at home, delivering scientifically validated results. Based on these results, the Hearing Aid feature can be activated, offering real-time amplification and clarity adjustments tailored to the user's specific needs. Additionally, active Hearing Protection helps prevent exposure to loud environmental noise, safeguarding users' hearing health in various settings.

Apple's integration of health features across its devices reflects a holistic approach to personal well-being. By combining the Apple Watch's comprehensive health monitoring with the AirPods Pro's advanced hearing health capabilities, Apple empowers users to take proactive steps toward healthier, longer lives.

"... getting upstream before problems become a clinical issue is important and prevention is key to that. So, the device that you wear all the time for all the other things like you're running a marathon or measuring your steps, if that can also give you a sign of something happening early in your health, that's really powerful."

Sumbul Desi, VP of Health at Apple

As Apple continues to innovate, the synergy between its devices will likely deepen, providing users with an increasingly interconnected health ecosystem. This holistic approach not only addresses individual health needs but also contributes to broader public health goals by promoting preventive care and early intervention, ultimately contributing to longer, healthier lives.

HEALTHY HUMAN LIFESPAN THROUGH A COMPLETE CLINICAL TECHNOLOGICAL PLATFORM

How Human Longevity INC Aims to Unlock the Key to Longevity for the Individual - *but invites a more fundamental change.*



CASE 8

Human Longevity INC

What if we could harness our genes to predict and even prevent diseases before they manifest? Human Longevity INC believes we can. Founded in 2013 by J. Craig Venter, Peter Diamandis, and Robert Hariri, and having raised a total of **\$375 million** in funding since their inception, Human Longevity INC is pushing the boundaries of marrying genetic and technology, and giving the power to the consumer. Their mission is clear: to extend human lifespan and enhance healthspan through a clinical platform integrating genomics, artificial intelligence, and precision medicine.

“When I was in medical school, I saw a documentary on certain species of whales, turtles and sharks that could live hundreds of years, and in theory, as long as 700 years. I remember thinking, “If they can, why can’t we?”

Peter H. Diamandis, Co-Founder & Vice Chairman

At the core of Human Longevity INC’s strategy is the creation of an unparalleled database of genetic and health information, combined in a platform targeted **health clinics**. By collecting extensive data on genetic, biochemical, and environmental factors, Human Longevity INC is laying the groundwork for personalized health strategies. This includes full-genome sequencing and advanced imaging technologies, which empower

Human Longevity INC to predict and potentially prevent age-related and non-age related diseases. Human Longevity INC analyzes this vast data to identify patterns that would prevent diseases like cancers, heart diseases, and Alzheimer’s before they develop.

Human Longevity INC’s flagship service, **Health Nucleus**, combines full-genome sequencing, advanced imaging (like MRI and CT scans), blood and metabolic testing, microbiome analysis, and consultations with physicians to provide a complete picture of health. For a fee between \$4,950 and \$25,000, clients receive an unparalleled health profile that goes beyond what most traditional health systems offer. The idea behind their pricing strategy is essentially that it represents a personal investment, with the payoff being the prevention of illness — and the associated troubles and costs — offering a compelling value proposition for both the individual clients, but also the healthcare system as a whole.

Human Longevity INC’s financial journey has experienced significant fluctuations. Its valuation peaked at \$1.2 billion in 2016, dropped to \$310 million in 2019, and surged back to \$1 billion in 2022. As competition intensifies, with companies like Color Health raising nearly half a billion dollars, the pressure to innovate remains critical as the longevity space attracts increasing attention.

The high cost of services like Health Nucleus currently limits their personalized healthcare largely to the wealthy, prompting the question: will advanced health

technologies remain exclusive, or could they eventually become accessible to a broader population?

The idea of a future where preventive, personalized healthcare is accessible to everyone is aspirational and possible, yet several challenges remain. Achieving this shift would necessitate systemic changes in healthcare policy and pricing models. If successful, it could pave the way for a future where preventive care is available to all the levels of society, and not only the wealthy few.

The role of insurance and healthcare policy reform may be critical in this context. If insurers were to cover preventive genomic tests, it could drive wider adoption of these technologies. In publicly funded healthcare systems, governments might view such innovations as a means to reduce long-term costs associated with chronic illnesses, and expensive treatments.

In Denmark, for instance, the public debate already emphasizes the importance of preventive care in more broad terms. Effective policies could build on this foundation, making longevity clinics a natural extension of public healthcare. However, such transformation requires recognizing the long-term cost-saving potential of preventive, data-driven healthcare.

Human Longevity INC. is at the forefront of a future that promises enhanced health and longevity through a clinical data driven platform. The integration of genomics and artificial intelligence into preventive healthcare has the

potential to revolutionize aging and disease management. However, **addressing financial barriers** is essential to ensure equitable access to these advancements. To achieve health equity, it is crucial to advocate for policies prioritizing preventive care and develop new insurance models that make personalized medicine a standard rather than a luxury.

Seconds of Insight

Human Longevity INC Health Nucleus:

The Health Nucleus platform uses whole genome sequence analysis, advanced clinical imaging and innovative machine learning – combined with a comprehensive curation of personal health history – to deliver the most complete picture of individual health.

SOCIETAL LONGEVITY

As advances in science and technology extend human lifespans, society faces profound questions about how to embrace this new era of longevity. Living longer is no longer an abstract concept—it is becoming a tangible reality, fueled by breakthroughs in genomics, preventive medicine, and innovative technologies. But how can society adapt to a world where living beyond 100 or more years becomes common? Will this longevity movement necessitate incremental adjustments to existing systems, or does it demand a fundamental rethinking of how we structure our lives, economies, and healthcare systems? This section examines, through case studies, how society can adapt to address the challenges and seize the opportunities presented by longer lifespans. From the integration of cutting-edge technologies into healthcare to addressing inequalities in access, these adaptations will shape the future for individuals and communities alike. The focus of this section is on four key initiatives: Stanford Center on Longevity, The R42 Institute, Conboy Labs, and Penuvo. Each represents a unique perspective on how technology and initiatives together with society can reimagine aging to foster not only longer lives but better lives.

The Necessity For Societal Adaptation

The promise of longer lifespans brings with it a host of challenges that extend far beyond healthcare. Financial systems will need to adapt to support extended retirements and a changing healthcare landscape. Educational pathways may require restructuring to enable lifelong learning as careers stretch across multiple decades. Communities and social structures have to evolve to ensure that extended lifespans are filled with purpose, connection, and vitality.

The Stanford Center on Longevity highlights this need for systemic change through its “New Map of Life” initiative. This blueprint emphasizes three critical pillars for thriving in a 100-year life: financial security, healthy living, and social engagement. These principles align closely with broader societal goals, demonstrating that thriving in longevity is not just about medical breakthroughs but about rethinking how we live and interact as a society at all ages.

From Incremental to Transformative Change

While some innovations in longevity may appear incremental, such as improving early detection or enhancing cellular health, their societal implications are transformative. The R42 Institute represents a different approach to societal advancement, bridging academia, venture capitalism, and associations to work toward a common goal: bringing longevity to the people.

Similarly, Conboy Labs’ research into therapeutic plasma exchange represents a paradigm shift in how we might think about aging. Their work suggests that aging could be mitigated through relatively simple interventions,

creating a future where healthspan is extended alongside lifespan. Such breakthroughs could alleviate some of the financial and emotional burdens of aging by reducing the prevalence of chronic illnesses that often accompany longer lives.

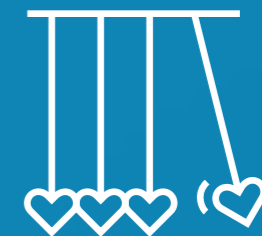
Equity in Longevity

A central question in the longevity revolution is one of equity: who will benefit from these advancements? Penuvo’s whole-body MRI scans, an existing technology, offer promising potential for early detection and prevention but remain financially out of reach for many. Penuvo’s aim to change this. Efforts to democratize access, such as reducing costs through AI advancements or integrating preventive care into public health systems, will be crucial to ensuring that longevity does not exacerbate existing inequalities.

A New Vision for Society

Ultimately, adapting to longer lifespans requires more than technological and medical innovation—it demands a cultural shift in how we view aging, and disease. The Stanford Center on Longevity’s work emphasizes that thriving in a 100-year life involves not just adding years but enriching those years with purpose, vitality, and connection. This perspective challenges the notion of aging as a period of decline, reframing it as an opportunity for reinvention and growth.

As we explore the work of The R42 Institute, Stanford Center on Longevity, Conboy Labs, and Penuvo, this section aims to illuminate how forces in society can rise to the challenge when the demographic of lifespan changes. The future of longevity depends not only on scientific breakthroughs but also on how we all choose to structure and embrace this new reality. Will we merely adapt incrementally, or will we seize the opportunity to fundamentally rethink what it means to live a long, fulfilling life?



UNLOCKING LIFE - A NEW VISION FOR THRIVING OVER A 100 YEARS

How Stanford University Sees Longevity
Redefining Everything

CASE 9 Stanford Center on Longevity



The Stanford Center on Longevity is at the forefront of innovation and research in academia, aiming to enlighten and transform the way we age and live. They are doing so by blending cutting-edge research with societal insights to ensure that we don't just add extra years to life, but also fill these extra years with purpose, vitality, productivity, and health. But can Stanford's ambitious vision of living a thriving 100-years map out the future of aging?

The Stanford Center on Longevity was founded in 2007 by psychologist Laura Carstensen and neurologist Thomas A. Rando, who were both inducted into the National Academy of Medicine in 2017. Their mission for the center is to *“accelerate and implement scientific discoveries, technological advances, behavioral practices, and social norms so that century long lives are healthy and rewarding”*. The Center's main focus is therefore on how to redesign society in a way that ensures thriving rather than surviving in a 100-year life. Longevity is, according to the Center, not just about medical advancements, but also about the way we view work, how we educate, and our relationships as we age, since the choices made early in life have a rippling impact on the later stages. To reach a higher quality of life in advanced age, the Stanford Center on Longevity has launched their landmark initiative, *“New Map of Life,”* which is a blueprint of principles for a future where extended old age is a blessing—marked by vitality and purpose—rather than a chapter of decline, and where every stage of life is embraced as times of opportunity and productivity.

The Stanford Center on Longevity has identified three overarching pillars that determine how well we age: financial security, healthy living, and social engagement. Each of these three pillars is critical in ensuring that the extended lifespan will be filled with quality. Their **Sightlines Project** focuses on these three pillars in an ambitious study that tracks more than 1.2 million Americans over two decades, revealing a snapshot of how well-prepared Americans are for longer lives. The study shows that there have been improvements over the decades, such as a steady decline in smoking and an increase in exercise, but new issues have also emerged, such as the rise of sedentary lifestyles and financial instability.

Financial instability is higher among younger generations, and particularly millennials are struggling with staggering debt, and fewer are saving for retirement at the levels needed to ensure stability later in life and for a longer life. The increasing financial instability among the younger generations in a world where most people may live to a 100 years poses serious reflections, and the question to ponder is: *“How can we redesign financial systems to support not only longer lives but also delayed retirements, scaled-down retirements, retirements that may be momentarily paused, and a healthcare landscape evolving in ways that are both potentially positive and distinct?”* In this light, the Center is clear that urgent policy reforms and innovations are needed for stability for current and future generations.

On the pillar of social engagement, they have found that not only are social connections a “nice to have,” but they are essential for one's long-term wellbeing. The data, however, shows that social engagement is declining among newer generations, marked by the fact that Baby Boomers are less likely to participate in community activities or maintain strong ties with their family, friends, and neighbors. Even though technology has created new ways to stay connected, it's still too early to tell if online interactions can substitute the benefits of physical connections. The Stanford Center on Longevity remains optimistic about the transition from physical to online connections to maintain and enhance quality of life and calls for innovation in building communities that support the change in how we age.

The Stanford Center on Longevity is not merely an academic hub for data and research; it is actively transforming lives and driving real-world impact through its work. One of the ways to keep thriving later in life is by not slowing down but starting new adventures and reinventing oneself. They have therefore hosted a **Longevity Transitions Salon**, where they brought together thought leaders to share their experiences and reinvention, and how that helped them redefine what it means to find purpose and impact in later life. In a world where 100-year lives are becoming a reality, there's immense potential for reinvention, for both individuals and society.

The Stanford Center on Longevity is pioneering a new direction for the future, fueling a fundamental shift in how we understand aging. Aging is no longer seen as a decline in well-being and purpose, but instead as a process that can be optimized, celebrated, and extended. Through research, policy advocacy, and public engagement, the Stanford Center on Longevity is building a world where longer lives mean better lives. And as we move toward a world where living to 100 becomes the norm, the work they do is more important than ever.

Seconds of Insight

New Map of Life: a summary report outlining a set of *“principles”* as the basis for *“momentous and creative changes in the ways we lead our 100-year lives, at every stage.”*

SHAPING THE FUTURE FOR A LONGER-LIVED SOCIETY

How the R42 Institute Fosters Grassroot Communities to Embrace the Future of Longevity.

CASE 10 R42 Institute

The R42 Institute is a seed-stage venture capital firm and educational institute advancing innovation across artificial intelligence, biotechnology, 5G, and financial technology. With a strong focus on deep science, R42 partners with entrepreneurs from the earliest stages of development. Beyond funding, the firm is dedicated to building collaborative communities that drive societal impact through transformative technologies.

Founded in 2004 by Ronjon Nag, a renowned entrepreneur and Stanford professor with successful exits to Motorola, BlackBerry, and Apple. He was an inductee in the Silicon Valley Engineering Hall of Fame in 2024, previous awards include Bill Packard (Founder of HP), Steve Wozniak (founder of Apple), and Gordon Moore (Intel; Moore's Law). Further a repeat keynote and collaborator of The Buck. The R42 Institute fosters ventures and cultivates communities of innovators committed to building a better, longer-lived future.

The R42 Institute mentors and invests in early-stage companies within AI, deep science, and biotechnology, specifically targeting breakthrough technologies in healthcare and longevity. Primarily focusing on early-stage companies, from pre-seed to growth stage, R42 partners with entrepreneurs long before products hit the market, even engaging at the idea stage when teams are still forming. This approach positions The R42 Institute at the forefront of transformative scientific ventures.

Among The R42 Institute's notable investments are companies like Healx and Rubedo, each exemplifying the firm's commitment to longevity. Healx, for instance, uses AI to analyze biomedical data, streamlining drug discovery for rare diseases and bypassing conventional models to accelerate solutions. Rubedo, meanwhile, targets aging at the cellular level, developing medicines aimed at keeping people biologically young by targeting pathological cells that drive aging and chronic diseases. Their work focuses on addressing the underlying biological drivers of aging, with the goal of extending health spans and thereby improving the overall quality of life.

"we're attempting to develop a vaccine targeting aging—a true moonshot project akin to the kind I've tackled throughout my career"

Professor Ronjon Nag, Managing Director and Founder of The R42 Institute

With 28 investments and counting, The R42 Institute's active portfolio showcases both high deal flow and adaptability across early to mid-stage ventures, reflecting a willingness to take bold risks and explore uncharted opportunities—an essential trait for driving the true innovation that fundamental societal change demands. Notable recent engagements include Healx, which has raised a total of \$113.38 million, including a \$47 million Series C, and Rubedo, with \$53.45 million raised, including

a \$40 million Series A. These investments demonstrate The R42 Institute's commitment and capability to support companies through critical phases of clinical development while advancing the ambitious agenda for meaningful real-world impact.

Central to the institute's approach is its dedication to community-building through them. Operating as both a **Think Tank** and an **Educational Hub**, the R42 Institute brings together innovators from diverse backgrounds to explore AI and deep science, and different avenues for raising capital and to mature your idea.

Their **Fellows Program**, a 12-week, no-cost AI training program fosters a cross-generational community where undergraduates, graduate students, and mid-career professionals collaborate on projects. This initiative fosters a cross-generational network equipped to tackle complex societal challenges related to longevity, health, and resilience.

Further extending its reach, The R42 Institute organizes a **Public Series**, offering accessible insights on topics such as generative AI and age-related disease research. These public discussions create an informed community that bridges knowledge gaps and empowers broader engagement with longevity science. Through these

efforts, R42 positions itself as not only an investor but a thought leader and facilitator in the public dialogue around aging and related societal change.

R42 Institute is building foundations for a research and commercial ecosystem prepared to thrive in an era of extended life spans. It recognizes the encompassing importance of the longevity movement. By supporting innovative solutions in longevity science and cultivating communities equipped to meet these challenges, R42 is exemplifying a comprehensive, societal-embracing and future-oriented approach to longevity.

Seconds of Insight

The Buck Institute (The Buck): The institute, located north of San Francisco in the Novato Hills, is fully dedicated to researching aging and age-related diseases. Established in 1999, it operates as an independent biomedical research institute and is recognized as a global leader in longevity research.



AN ACADEMIC APPROACH TO ENGINEERING YOUTHFULNESS IN INDIVIDUALS AND SOCIETY

How UC Berkeley Addresses the Unsustainable Side of an Aging World

CASE 11 Conboy Labs

With populations aging worldwide, health systems are facing higher burdens for each day, and billions of dollars are being spent each year on managing age-related diseases. In Denmark alone, chronic illnesses have experienced a 60% surge in the past decade, and this trend shows no signs of stopping. In the U.S., adults aged 65 and older account for a disproportionate share—approximately 75% by some estimates—of healthcare spending dedicated to treating diseases. At **UC Berkeley's** Conboy Lab, led by Drs. Irina and Michael Conboy, they are challenging the conventional approach to aging. Instead of treating the issues that come with aging, the Conboy Labs are aiming to delay or even reverse some aspects of aging before it happens - making life healthier and easier as we grow older. Their work could pave the way for a future where healthcare systems can significantly and fundamentally restructure allocation of their resources.

Aging often leads to illnesses such as Alzheimer's and heart diseases, as cells and tissues in the body begin to wear out - but Conboy Labs has a new angle to tackling this issue. By removing certain aging factors from the blood, they believe it's possible to keep cells "young" for longer. Their primary technique is plasma exchange, which filters out old proteins in the blood and replaces them with a neutral solution. Tests in mice have shown promising results, like improved tissue repair and cellular health, suggesting that aging might not be as permanent as once thought.

"Our research shows that aging may not need complex drugs - just removing harmful proteins from the blood can have big effects,"

Dr. Michael Conboy. UC Berkeley's Conboy Lab

By focusing on keeping cells younger, the Conboy Labs' work has the potential to extend not only lifespan but also reshape the trajectory of human disease—prolonging the period during which people remain healthy, active, and independent. Consequently, this would result in a **substantial reduction in healthcare spending** as a fortunate side effect.

Therapeutic plasma exchange, as explored by Conboy Labs, involves more specifically removing plasma containing aging-related proteins and replacing it with a fresh, neutral solution. Early research on this technique, conducted in mice, demonstrated its therapeutic potential by showing that it could make older mice appear younger—and vice versa. Conboy Lab's research has since progressed to human trials, where aged participants are already reporting notable improvements in energy levels, joint health, and mental clarity.

If plasma exchange continues to show positive results, it could reshape aging care as we know it. Instead of spending billions on managing age-related diseases, we might be able to prevent some of these conditions from developing

Seconds of Insight

Therapeutic plasma exchange: TPE, also known as plasmapheresis, is a procedure that removes and replaces plasma to treat autoimmune, neurological, and kidney diseases, as well as potentially mitigate the effects of aging. By reducing harmful substances in the bloodstream, it can be life-saving; however, it carries risks such as low blood pressure and introducing infections.

in the first place. With more people living longer, societies will face increasing healthcare costs to manage conditions like dementia, arthritis, and cardiovascular disease. In the U.S. alone, these costs are predicted to keep rising as the elderly population grows. Through plasma exchange and other rejuvenating techniques, Conboy Lab envisions a world where aging doesn't have to mean constant hospital visits and medications. As a result, society as a whole would benefit from reduced costs and **increased productivity driven by a more active and healthier population.** This population would delay retirement, place less strain on healthcare systems, and continue contributing to the economy for longer.

Moving plasma exchange from the lab to real-life treatment is, however, not a trivial matter, and it requires funding, research partnerships, and an affordable way to offer these treatments to everyone. To support their work, Conboy Labs recently received a \$3 million grant from Open Philanthropy, enabling them to continue their work to the next step.

The lab is also working on other treatments that target cell repair and regeneration, including gene editing and bioengineering. These efforts aim to make treatments simpler, more affordable, and easier to distribute widely, ensuring that everyone, not just those with special access, can benefit from these breakthroughs.

An important distinction here is that the Conboy Lab is looking beyond simply adding years to life; their focus extends beyond longevity as an end in itself. They aim to ensure those additional years are vibrant, filled with energy and strength. Their work isn't only about delaying the effects of aging—it's about empowering people to live fully, without being overshadowed by the inevitability of age or the looming specter of decline. With the help of researchers, doctors, and funding from organizations like Open Philanthropy, Conboy Lab's research is moving closer to reality. The lab wants to shape society to where aging doesn't have to limit us.



THE PROACTIVE LONGEVITY JOURNEY STARTS WITH WHAT WE HAVE

How Penuvo Position the MRI to Help Individuals Take Full Control

CASE 12 Penuvo



Over the past decade, the intersection of technology and healthcare has unlocked new opportunities for preventive medicine, giving power back to individuals by enabling proactive control over their own health. One other example of this shift is Penuvo, a company offering comprehensive whole-body MRI scans that promise early detection of 500+ conditions, ranging from early-stage cancers to structural issues like hernias and scoliosis. Through the company's cutting edge AI-powered technology, Penuvo is redefining health maintenance, by offering users not just a peace of mind but actionable insights into their wellbeing. But what does this shift towards preventive screening mean for individuals and society?

In traditional healthcare systems, as discussed, the focus is often on reactive treatments, addressing health issues only after they have already manifested in some form. Penuvo's proactive MRI scans provide a shift toward early detection, which potentially reduces healthcare costs by addressing diseases in their developing and early stages, which avoids future treatments and costly hospitalizations. Studies show that healthcare costs are highest in the last years of life, as people usually have complex, late-stage illnesses demanding extensive and expensive care. Age itself has never caused a death. Death is always the result of some form of bodily malfunction, whether mechanical or pathogenic. **It's not age that kills, but the conditions that accompany it.** Penuvo's scans aim to address these causes by detecting health risks early—before they would otherwise be identified or progress to an irreversible stage—ultimately reducing associated healthcare costs. For those at high risk, these scans offer reassurance and proactive health management.

“Our mission is to empower people to be proactive about their health. Through early detection, we're helping people lead longer, healthier lives - and ultimately saving on healthcare costs down the line”.

Andrew Lacy, Founder of Penuvo

Penuvo's MRI scans are radiation-free and non-invasive, and therefore they are offering a safer, comprehensive option for regular health assessments. The 60-minute scan provides an in-depth look at the body's systems by covering organs, bones, and soft tissues with remarkable detail. This capability has helped many users discover conditions that would otherwise go undetected.

Chris, a Penuvo client who considered himself in good health, discovered a fist-sized tumor in his kidney during his scan. He praises the scan, and says *“If I had waited a year or two, that tumor would have gone elsewhere in my body, and we would not be having this conversation.”* Thanks to Penuvo, his tumor was caught early when treatment was simpler and less invasive.

Despite its benefits, whole-body MRIs are not without critics. False positives are a common issue with sensitive imaging, and it can lead to unnecessary tests, expenses, and anxiety for the individual. One of the leading radiologists, Doctor Rebecca Smith-Bindman, therefore warns, that *“there's no strong evidence that whole-body MRIs extend life expectancy, and such scans can result in a cascade of further procedures that may not be necessary”.* While whole-body MRIs could enhance peace of mind, the medical community continues to debate their efficacy in a preventive model. Penuvo counters this by refining its technology, incorporating AI to better differentiate between benign findings and conditions that may warrant further investigation. Additionally, the company has launched clinical trials to validate the long-term benefits of preventive screenings, with hopes of making them accessible to a broader demographic - and to be considered as a natural tool for the typical healthcare provider, and the typical healthcare plan.

Whole-body MRI services are increasingly popular among tech-forward consumers, from influencers to health-conscious professionals. The challenge, however, lies in making these services accessible beyond a niche, high-income demographic. Penuvo's current \$2,500 price point remains a barrier for many, but with advancements in AI and MRI technology, Lacy envisions a future where routine scans could cost as little as \$500, making preventive care accessible to most. By increasing affordability, Penuvo would help relieve pressure on the healthcare systems. Lacy has multiple times emphasized the company's goal to make preventive health measures more widely accessible, aiming to help individuals manage their health proactively regardless of any economic barriers.

Penuvo's whole-body MRI scans exemplify how existing technology can be reimaged to improve longevity and address the growing burden on healthcare systems. By leveraging MRI technology for preventive rather than reactive healthcare, Penuvo enables individuals to proactively manage their health and longevity. This shift toward early detection and intervention reduces the likelihood of costly, late-stage treatments while fostering a societal model that prioritizes prevention. As Penuvo continues to refine and expand its approach, it demonstrates the transformative potential of repurposing established tools to create a healthier, more sustainable future for all.

Seconds of Insight

MRI: MRI is a cutting-edge diagnostic tool that provides detailed, non-invasive imaging of soft tissues, organs, and structures. It excels in detecting abnormalities like tumors, strokes, and musculoskeletal issues without ionizing radiation, ensuring safety and precision.

CONCLUDING REMARKS

The future of longevity is no longer confined to the realm of science fiction. With advancements in biotechnology, personalized health tools, and systemic societal changes, the possibility of living longer, healthier lives is becoming a central topic for researchers, innovators, entrepreneurs, investors, and policymakers alike. This publication, *"The Future of Longevity"*, explores the multidimensional nature of longevity through three key lenses: scientific longevity, personal longevity, and societal longevity.



Scientific longevity

From the scientific longevity section, the central question revolves around where investments are focused: Is the aim to deepen our understanding of aging, or is it to develop cures and interventions that extend life and healthspan? The cases in this section—including Altos Labs, Calico Life Sciences, BioAge Labs, and Retro Biosciences—illustrate the breadth of approaches being taken. From cellular rejuvenation to genomic research, these initiatives highlight both the promise and challenges of potentially transforming aging into a preventable and treatable condition. The scope of this exploration highlights a transformative shift in health and life science investments emerging from Silicon Valley, set to help redefine the future landscape of healthcare and health investments, and poised to impact the global agenda.

Personal longevity

The personal longevity section shifts the focus to individual empowerment, exploring how accessible solutions can support people in making informed health choices. Companies like Function Health, Levels Health, Human Longevity INC, and Apple's health accessories demonstrate how technology enables individuals to monitor, optimize, and take control of their healthspan. This section invites critical questions about the accessibility and affordability of these tools: Will they remain the domain of the affluent, or can they be scaled to benefit a broader population? The scope ranges from simple informational tools to comprehensive health-monitoring systems that can fundamentally change how people approach longevity and how society may benefit on a more profound level - which naturally leads into the final section.

Societal longevity

The societal longevity section addresses the broader systemic implications of extended lifespans. How can communities and institutions adapt to ensure that longer lives are not only possible but also equitable and fulfilling? Cases such as the Stanford Center on Longevity, The R42 Institute, Conboy Labs, and Penuvo highlight both incremental improvements and transformative changes required in healthcare, education, and social structures. This section underscores the need for and outlines ways to foster collaborations and progress, ensuring the benefits of longevity are shared widely and equitably.

A Dynamic & Multifaceted Future

As the exploration across these three sections reveals, longevity is a complex and evolving field. The future of longevity is indeed now! While the potential benefits are immense, so too are the challenges, particularly in ensuring that advancements are accessible and inclusive. The answers to the research questions remain open, reflecting the dynamic and multifaceted nature of the subject.

We hope this publication has inspired readers to reflect on ways to live both longer and better, shaping a future where longevity becomes a shared opportunity for all. As a final inspiration from the 12 presented cases, we invite you to contemplate these three dimensions as you continue the dialogue on the future of longevity:

1. Economics

Longevity offers the potential for populations to remain healthier and active in society for longer. Economists have shown that the "gray wave" of the 1970s contributes approximately USD 3.2 trillion annually to the U.S. economy. Further research indicates that even a modest increase in life expectancy by 2.2 years could generate an additional USD 7.1 trillion over the next five decades. Extending the healthspan by 10 years could result in a staggering GDP boost of USD 367 trillion. With apt considerations and plan of action, the economic advantages of a healthier aging population are undeniable.

2. Opportunity

Advances in the science of aging have demonstrated that aging is inherently modifiable. Therapeutic interventions to slow aging are now a tangible reality, supported by emerging trends in research and entrepreneurship, particularly in Silicon Valley. These movements, though still estimated to be underhyped, signal a powerful and growing force shaping the future of health management.

3. Impact

The implications of longevity extend far beyond technological advancements and entrepreneurial innovation. They encompass disease treatment, compress morbidity, reduce healthcare costs, shorten retirement periods, forge new maps of life, prolong workforce participation, and sustain economic growth. Longevity invites us to reimagine societal frameworks, envisioning a future where health, innovation, and equity converge to benefit all.

The Future of Longevity

Ultimately, longevity is not about adding years to life but about adding life to years. It challenges us to create a world where longer lives are lived with purpose, health, and dignity. By embracing this vision, we can transform longevity into a universal opportunity that uplifts individuals, strengthens communities, and reshapes societies of the future.

THANK YOU

To our partners at the Danish Chamber of Commerce, especially Katrina Feilberg Schouenborg, Industry Director of Health and Life Sciences.

To Martin Vesterby MD, Lars Wegner MD, Professor Lene Juel Rasmussen, Peter Aksel Villadsen, Alexander Larsen, Tenna Korsbek Andreasen, Martin Broch, Martin Stenfeldt, Nadia Storm, Andreas Pihl MD, Vagn Nielsen, Professor Ronjon Nag, Martha Deevy, Yochai Shavit, Professor Malene Hansen, Professor Michael Snyder, Martin Kawalski MD, Daisy Robinton, Stephanie Lindstrom, Christin Glorioso MD, Eric Rasmussen, Justin Taylor, Professor Susanna Rosi, Madeleine Cule, Maddalena Adorno, James Payer, Zixuan An, Gwen Cheni, Karin Cooke, Anna Høybye, Jesper Kamp, Allan Skårup Kristensen & Professor Vilhelm Bohr for fruitful discussions and your inputs to the publication.

Writing and editing:

Innovation Centre Denmark in Silicon Valley: Sidsel Stepien Kjell Hjorth, Adam Dam, Ellen Gade Kristensen, Tania Clemensen Shuhaibar, Sigge Lennart Pettersson, Thor Bondorph Nielsen, Emilia Stefansson, Anders Christjansen, Helene Martine Overø Kristiansen, and Jon Therkildsen.

Innovation Centre Denmark Silicon Valley
299 California Avenue
Palo Alto, CA 94306, US
Date: January 2025
Design: Montgomery.dk

All rights reserved. No part of this project may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from the publisher.



SOURCES FOR FURTHER CONTEXT

CASE 1 - Altos Labs

Apollo Health Ventures Insights. (2022). *Altos Labs — The World's Best Funded Seed Company Dives Into Cellular Rejuvenation*. MEDIUM.COM.

Haluza, Yuliia, et al. (2024). *Axolotl Epigenetic Clocks Offer Insights Into The Nature Of Negligible Senescence*. BIORXIV.ORG.

Ji, Shuaifei, et al. (2023). *Cellular Rejuvenation: Molecular Mechanisms And Potential Therapeutic Interventions For Diseases*. NATURE.COM.

Regalado, Antonio. (2021). *Meet Altos Labs, Silicon Valley's Latest Wild Bet On Living Forever*. MIT TECHNOLOGYREVIEW.COM.

Altos Lab. (2025). *Guided By Pioneers In Science And Industry*. ALTOSLAB.COM.

Altos Lab. (2025). *Science At Altos*. ALTOSLAB.COM.

Altos Lab. (2024). *Shinya Yamanaka*. ALTOSLAB.COM.

CASE 2 - Calico Life Sciences

AbbVie. (2021). *Abbvie And Calico Announce Second Extension Of Collaboration Focused On Aging And Age-Related Diseases*. PRNEWswire.COM.

Bernstein, Nicholas, et al. (2024). *Analysis Of Somatic Mutations In Whole Blood From 200,618 Individuals Identifies Pervasive Positive Selection And Novel Drivers Of Clonal Hematopoiesis*. NATURE.COM.

CB Insights. (2025). *Calico Life Sciences Company Insights*. CBINSIGHTS.COM.

Regalado, Antonio. (2016). *Google's Long, Strange Life-Span Trip*. MIT TECHNOLOGYREVIEW.COM.

Therkildsen, Jon. (2023). *A Trend In How To Fundamentally Address Disease And Health Is Underway In The Business Of Modern Medicine*. SILICONVALLEY.UM.DK.

Calico. (2024). *Mapping The Mechanisms Of Aging*. CALICOLABS.COM.

CASE 3 - BioAge Labs

BioAge Labs. (2019). *Bioage Raises \$23m To Scale Ai-Driven Platform To Discover And Develop Drugs That Treat Aging*. MEDIUM.COM.

Greene, Karima. (2023). *A Longevity Expert Who Studied People Who Live To 110 On How Humanity And Ai Will Master Aging*. CNBC.COM.

Khosla, Vinod, et al. (2019). *Openai Is An Ai Research And Deployment Company Whose Mission Is To Ensure That Artificial General Intelligence Benefits All Of Humanity*. KHOSLAVENTURES.COM.

Pryan, Vishnu. (2024). *Bioage Secures \$170m For Obesity Therapeutics Development*. PHARMACEUTICAL-TECHNOLOGY.COM.

Smith, Jonathan. (2022). *AI And Biobanks Could Open The Way To Longevity Treatments*. LABIOTECH.EU.

BioAge Labs. (2025). *Aging Is A Multifactorial Process That Drives Many Severe Diseases*. BIOAGELABS.COM.

Bio Age Labs (Cool, Rebecca). (2024). *NLPR3 - A Key Mediator Of Chronic Inflammation That Develops With Age*. BIOAGELABS.COM.

CASE 4 - Retro Biosciences

Brueck, Hilary. (2024). *Sam Altman's Mission To Increase Human Lifespan With A \$180 Million Shipping Container Experiment At Retro Biosciences*. BUSINESSINSIDER.COM.

Forbes. (2024). *Profile: Sam Altman*. FORBES.COM.

McPherson, Stephanie M. (2024). *What Would You Do With 10 Extra Years?*. MIT.EDU.

Rees, Mathieu. (2023). *Autophagy: Everything You Need To Know*. MEDICALNEWSTODAY.COM.

Terry, Mark Terry. (2022). *Mysterious Retro Biosciences Launches To "Increase Healthy Human Lifespan By 10 Years"*. BIOSPACE.COM.

Retro Biosciences. (2025). *Our Science*. RETRO.BIO.

CASE 5 - Function Health

Elliott, Bryan (2023). *Function Health On Using Ai-Powered Learning To Improve Your Health*. INC.COM.

Haupt, Angela. (2024). *What Getting 105 Blood Tests From A Health Startup Taught Me*. TIMES.COM.

Heather Landi. (2024). *Function Pockets \$53m For Personalized Health Testing Backed By Celeb Investors Matt Damon, Pedro Pascal And Kevin Hart*. FIERCEHEALTHCARE.COM.

Pv, Sarath. (2024). *Top Investments By Andreessen Horowitz 2023*. EQVISTA.COM.

Function Health (Hyman, Mark). (2025). *How It Works. The First Membership For Your Lifelong Health*. FUNCTIONHEALTH.COM.

CASE 6 - Levels

CB Insights (2025). *Levels Company Insights*. CBINSIGHTS.COM.

Honderich, Holly. (2024). *Going Down The 'rabbit Hole' Of Wearable Blood-Sugar Monitors*. BBC.COM.

Lee, Sophia. (2024). *How Levels Health Is Revolutionizing The Way People Approach Their Metabolic Health*. RUPAHEALTH.COM.

Rose, Brent. (2021). *Levels Health Review: Optimize Your Fitness With A \$400 Glucose Tracker*. THEVERGE.COM.

Sohail, Syed Hamze. (2024). *Levels Raises \$10m To Expand Metabolic Health Platform*. HITCONSULTANT.NET.

Levels (Means, Casey). (2024). *The Levels Guide To Metabolic Health*. LEVELS.COM.

CASE 7 - Apple accessories

CB Insights (2025). *Apple Company Insights*. CBINSIGHTS.COM.

CB Insights Research Briefs (2019). *Apple Is Going After The Healthcare Industry, Starting With Personal Health Data*. CBINSIGHTS.COM.

Collins, Barry. (2022). *Apple Will Launch Health Insurance In 2024, Says Analyst*. FORBES.COM.

Conboy, Irina, et al.(2020). *Young Again*. ENGINEERING.BERKELEY.EDU.

Phelan, David (2024). *Apple Executives On 10 Years Of The Apple Watch – And Where It Goes From Here*. INDEPENDENT.CO.UK.

Phelan, David (2024). *Can the AirPods Pro 2 Really Replace Hearing Aids?* WIRED.COM.

Apple Hearing Health (2024). *Pioneering Hearing*. APPLE.COM.

Apple Inc. (2016). *Apple Introduces Apple Watch Series 2, The Ultimate Device For A Healthy Life*. APPLE.COM.

Apple Inc. (2025). *Apple Watch. Empowering Your Patients To Live A Healthier Day*. APPLE.COM.

CASE 8 - Human Longevity

Borfitz, Deborah (2020). *Human Longevity Inc. Changing Healthcare 'one Patient At A Time'*. DIAGNOSTICSWORLDNEWS.COM.

CB Insights (2025). *Human Longevity Company Insight*. CBINSIGHTS.COM.

Diamandis , Peter H. (2024). *Discover How Hli Is Extending The Healthy Human Lifespan Through Technology*. DIAMANDIS.COM.

Jabalameli, M.R. et al. (2024). *Polygenic Prediction Of Human Longevity On The Supposition Of Pervasive Pleiotropy*. NATURE.COM.

SNS Insider pvt ltd.(2024). *Healthcare Predictive Analytics Market Size To Reach Usd 126.15 Billion By 2032*. GLOBENEWSWIRE.COM.

Human Longevity INC (2015). *Human Longevity, Inc. Launches The Health Nucleus, A Comprehensive And Personalized Health Platform For Individuals*. PRNSWIRE.COM.

CASE 9 - Stanford Center on Longevity

Lewis, Danny. (2024). *How To Maximize The Surprising Upsides To Aging*. WSJ.COM.

Masterson, Victoria. (2022). *At Work For 60 Years – Is This What Living Longer Means For Our Kids?*. WEFORUM.ORG.

Stanford Center on Longevity. (2025). *About Stanford Center On Longevity*. LONGEVITY.STANFORD.EDU.

Stanford Center on Longevity (Carstensen, Laura L., et al.). (2018). *Seeing Our Way To Financial Security In The Age Of Increased Longevity*. LONGEVITY.STANFORD.EDU.

Stanford Center on Longevity. (2024). *Stanford Center On Longevity Launches Longevity Transitions Salon*. LONGEVITY.STANFORD.EDU.

Stanford Center on Longevity. (2024). *The Sightlines Project*. LONGEVITY.STANFORD.EDU.

CASE 10 - R42 Institute

CB insights. (2025). *Healx Company Insights*. CBINSIGHTS.COM.

CB insights. (2025). *Rubedo Company Insights*. CBINSIGHTS.COM.

HealX. (2025). *AI-Powered, Patient-Inspired Treatments For Rare Diseases*. HEALX.AI.

Preqin. (2024). *R42 Profile*. PREQIN.COM.

Rubedo. (2025). *Targeting Underlying Biological Drivers Of Chronic Diseases*. RUBEDOLIFE.COM.

Scott, Andrew j. (2021). *The Longevity Society*. THELANCET.COM.

Zambakhidze, Sophi. (2024). *Interview With Ronjon Nag, Managing Director And Founder Of R42 Group*. BRVENTUREFUND.COM.

R42. (2025). *About R42*. R42GROUP.COM.

R42 Institute. (2024). *R42 Institute AI Fellows Program Demo Day*. INSTITUTE.R42GROUP.COM.

CASE 11 - Conboy Labs

Berkeley Bioengineering. (2025). *Conboy Lab Awarded \$3million By Open Philanthropy*. BERKELEY.EDU.

Tekalp, Deniz. (2022). *An Interview With Dr. Michael Conboy*. BERKELEYSCIENCEVIEW.COM.

Thomas, Uduak. (2024). *Generation Lab Bets Big On Personalized Epigenetic Testing For Reversing Aging*. INSIDEPRECISIONMEDICINE.COM.

UC Berkeley Research (2024). *Irina Conboy Profile*. BERKELEY.EDU.

The Conboy Lab. (2024). *Accommodating An Aging World Is Posing Unsustainable Economic And Social Challenges*. BERKELEY.EDU.

The Conboy Lab. (2025). *List Of Publications*. BERKELEY.EDU.

CASE 12 - Prenuvo

CB Insights. (2025). *Prenuvo Company Insights*. CBINSIGHTS.COM.

Jenkins, Cassandra. (2024). *Prenuvo Now Providing Whole-Body Mri Scans In River Oaks Area*. COMMUNITYIMPACT.COM.

Stempniak, Marty. (2024). *Physicians Debate The 'perils And Promise' Of Whole-Body Mri Screening*. RADIOLOGYBUSINESS.COM.

Prenuvo. (2024). *It's Worth The Reat Of Your Life*. PRENUVO.COM.

Prenuvo. (2024). *Put Your Health In Your Hands*. PRENUVO.COM.

Concluding Remarks

Carstensen, Laura L., et al. (2022). *The New Map of Life*. STANFORD CENTER ON LONGEVITY.

Goldman, Dana P., et al. (2014). *Substantial Health And Economic Returns From Delayed Aging May Warrant A New Focus For Medical Research*. HEALTH AFFAIRS JOURNAL.

Lai, Wing-Fu, et al. (2011). *Beyond Sole Longevity: A Social Perspective On Healthspan Extension*. NIH.GOV.

Murphy, Kevin M., et al. (2006). *The Value Of Health And Longevity*. UC CHICAGO AND NATIONAL BUREAU OF ECONOMIC RESEARCH.

Scott, Andrew, et al. (2021). *The Economic Value Of Targeting Aging*. NATURE.COM.

Scott, Andrew. (2021). *Working Life – Labour Supply, Ageing And Longevity*. THE ROUTLEDGE HANDBOOK OF THE ECONOMICS OF AGEING.