LAWRENCE, EVANS & CO., LLC
Investment Banking | Healthcare Finance | Consulting

LONGEVITY

The Emerging Infrastructure of Preventative Health

December 2025

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What is Healthcare Longevity?

WHAT IS HEALTHCARE LONGEVITY?

Healthcare longevity aims to extend healthspan by targeting the root causes of aging through personalized, preventative care that combines clinical and research innovation.

By focusing on **three interrelated pillars** that guide research and commercial applications, healthcare longevity transforms our perspective on aging:

Data and Diagnostics

Enables proactive interventions through personalized risk assessments and monitoring apps, optimizing long-term health before diseases arise.

Clinical and Preventive Care

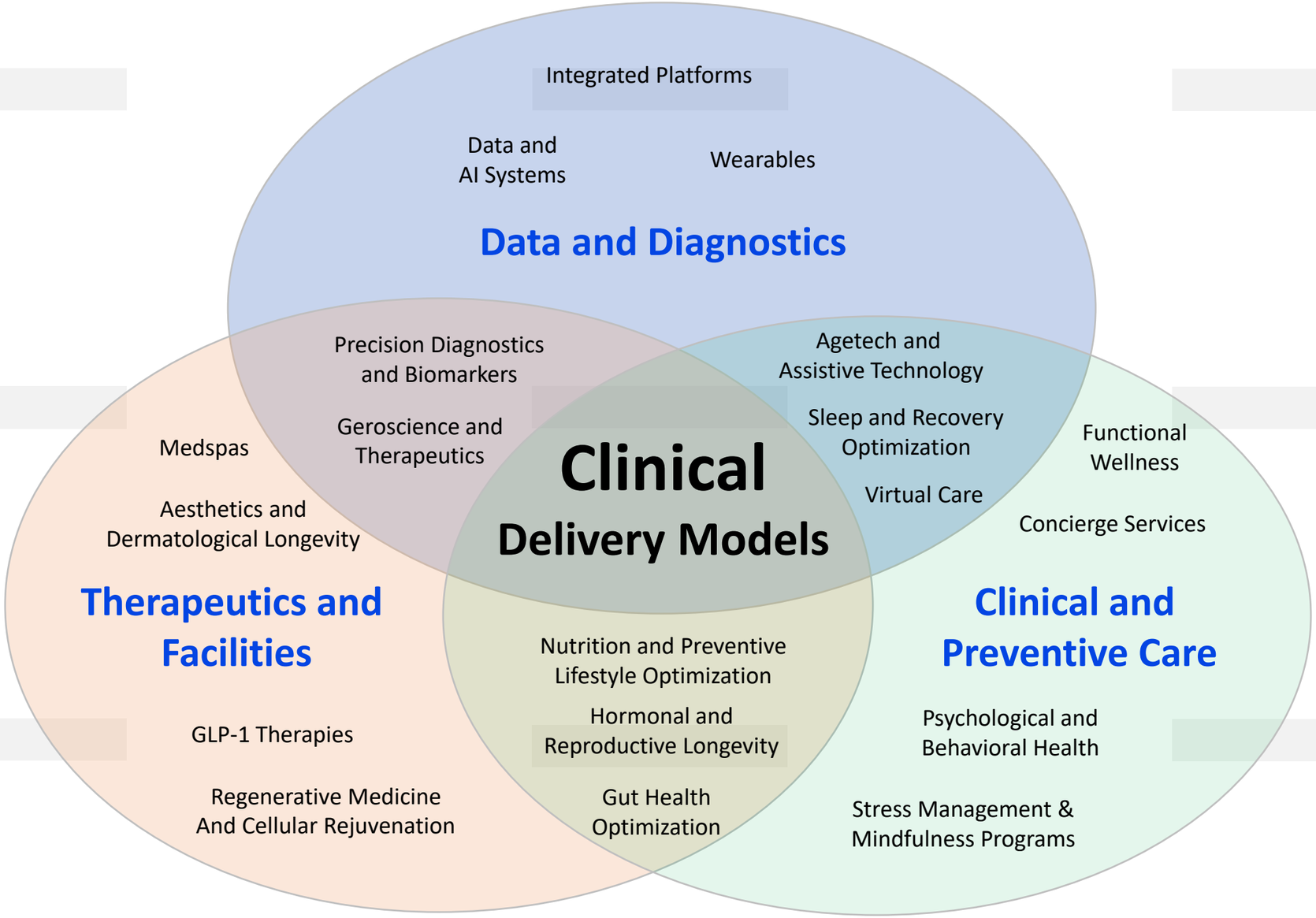
Provides accessible tools for stem cell treatments and hormone optimization, slowing aging and enhancing vitality in everyday use.

Convergence of Fields

Delivers community programs and telemedicine for regular check-ups and habit coaching, preventing chronic issues for active aging.

healthcare longevitys dynamic ecosystem, we offer our **Healthcare Longevity Framework**, which illustrates how we view and organize longevity innovations—from diagnostics and therapeutics to integrated care—providing a structured lens for investors and stakeholders.

HEALTHCARE LONGEVITY FRAMEWORK

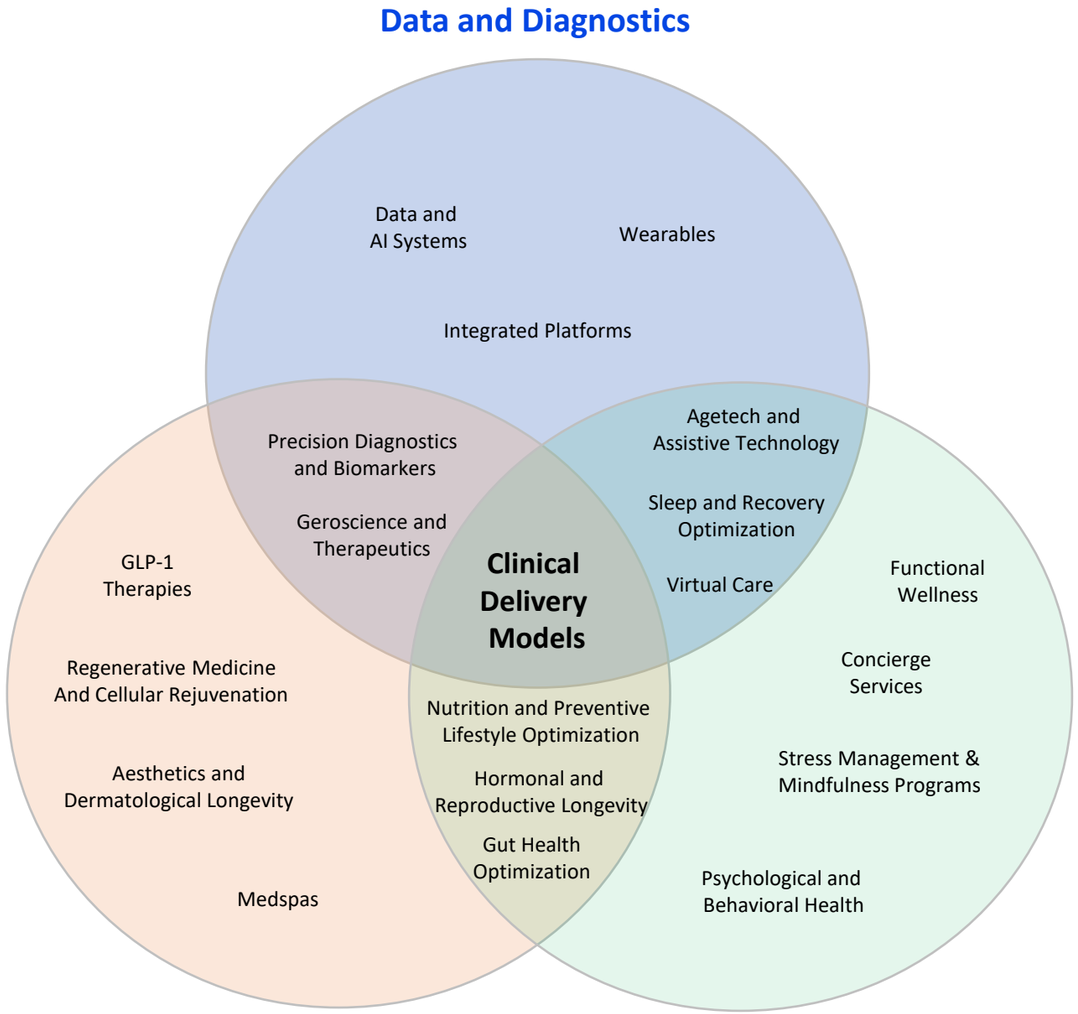


HEALTHCARE LONGEVITY FRAMEWORK

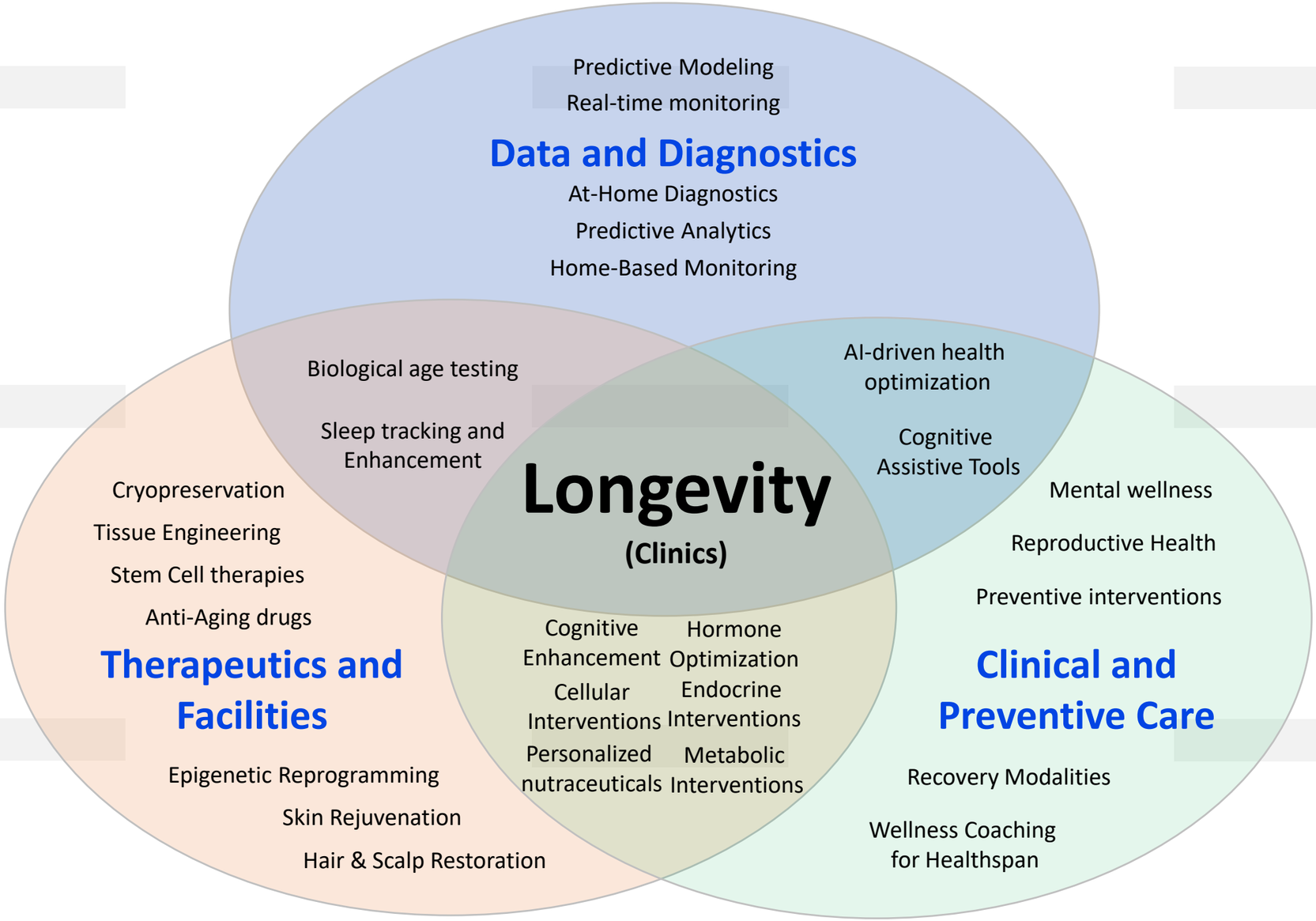
Healthcare longevity is complex and multidisciplinary, lacking a unified framework. Viewing it as an ecosystem focused on extending healthy years helps streamline understanding.

- The field shifts from reactive medicine to proactive, personalized care, using data, advanced treatments, and expert guidance to prevent age-related decline.
- The proposed model organizes healthcare longevity into three interconnected pillars:
  - **Data and Diagnostics (blue):** Collects and analyzes health data to guide decisions.
  - **Therapeutics and Facilities (red)**: Focuses on physical interventions, treatments, and infrastructure to repair or improve the body.
  - **Clinical and Preventive Care (green):** Involves human-centered care and ongoing health maintenance.
- These three pillars intersect at Clinical Delivery Models, which would integrate all components for comprehensive, preventive care.
- The model reflects 2025 trends such as AI-driven personalization and hybrid (virtual + in-person) healthcare that prioritize prevention.
- The overlaps illustrate real-world connections—e.g., diagnostics data guiding therapies monitored through clinical care.
- Each pillars includes market sectors like Geroscience and Therapeutics and Integrated Platforms, forming the core domains of healthcare longevity.
- The sectors can be further broken down into detailed subsectors which are further explored on the next slide.

For detailed insights into these sectors, please refer to Appendix A.



HEALTHCARE LONGEVITY FRAMEWORK: DETAILED SUBCATEGORIES



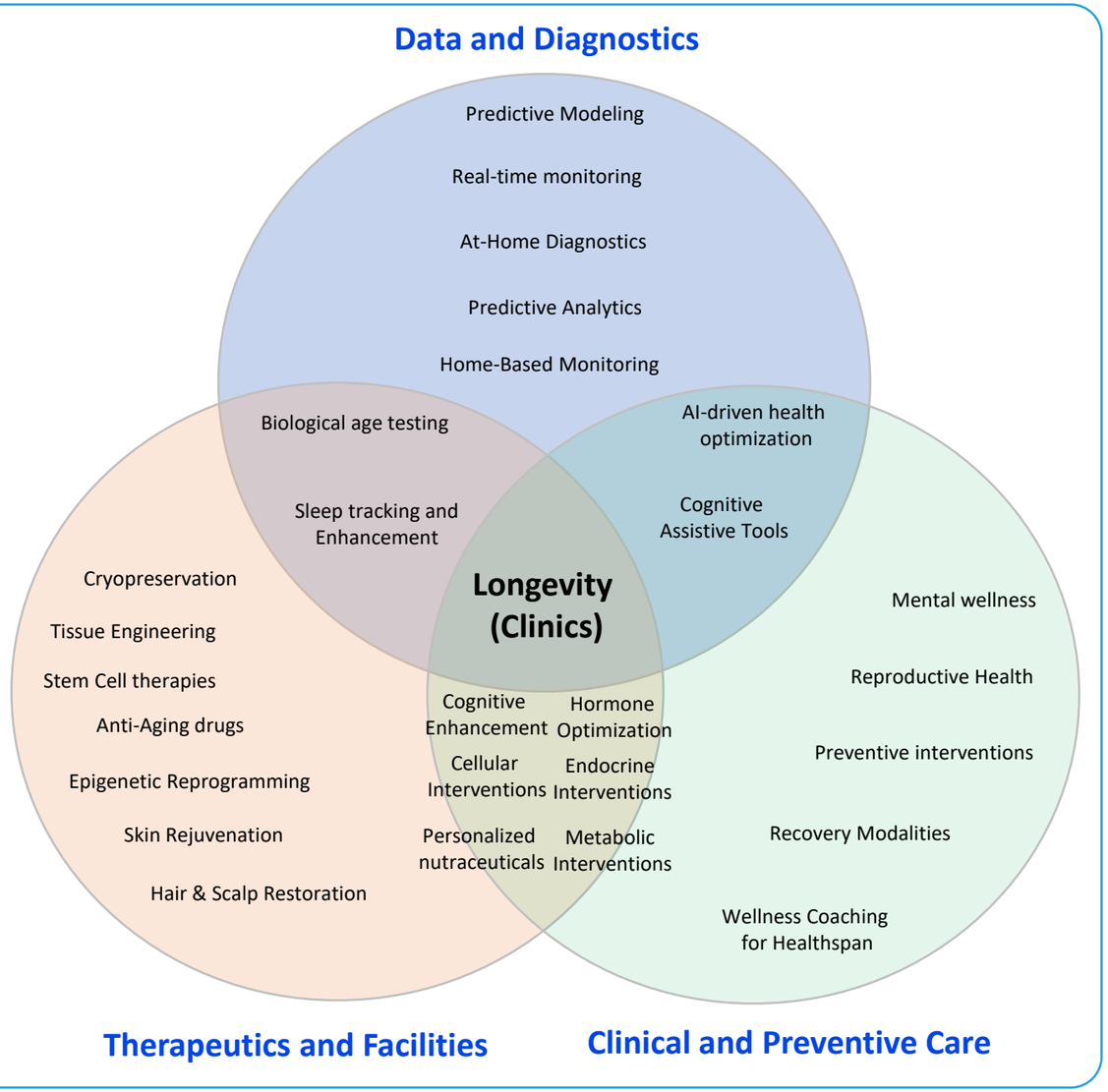
HEALTHCARE LONGEVITY FRAMEWORK: DETAILED SUBCATEGORIES

By grouping high-potential products, services, and technologies into subsectors, we offer another way of thinking of the three longevity pillars:

- **Data and Diagnostics (blue):** Features predictive monitoring and at-home diagnostics for real-time insights and informed decision-making.
- **Therapeutics and Facilities (red):** Highlights anti-aging drugs and cryopreservation to drive clinical efficacy and revenue generation.
- **Clinical and Preventive Care (green):** Emphasizes AI-driven health optimization and wellness coaching to sustain patient engagement.
- **2025 Market Trends:** Rapid GLP-1 advancement and widespread wearable integration highlight strategic opportunities for technology, therapeutics, and care integration.
- **Convergence at Longevity (Clinics)**:
  - The three core components intersect centrally in Longevity delivery through investments in Longevity (Clinics), which are building scalable, patient-centered models with strong potential for advancing healthy aging. This evolving sector is maturing quickly, supported by growing confidence and funding that signal viability, though broad empirical proof is still emerging.
  - We see this convergence as the **"heart" of Longevity** — the vital core uniting scientific advancements, personalized care, and scalable models to extend healthspan. We provide a **dedicated section later in this whitepaper** exploring their role in further depth.

Note: Examples are illustrative, not exhaustive, reflecting healthcare longevity's evolving and dynamic nature with continuous innovation.

For more information on these subcsectors, please refer to Appendix B.



Background Information

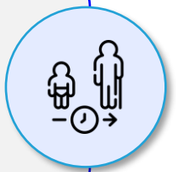
BACKGROUND INFORMATION: MEASURING LONGEVITY

- Healthcare longevity focuses on improving vitality and well-being with age, not just extending life.
- The key question is how gracefully people age—staying strong, mentally sharp, and enjoying life as the U.S. population grows older.
- According to the CDC, **U.S. life expectancy is 78.4 years** (75.8 for men, 81.1 for women), projected by IHME **to reach 80.4 by 2050**.
- The main goal is to reduce the 14 years Americans typically spend in poor health, often due to chronic diseases like heart disease, diabetes, and dementia.
- **Women generally face more years of poor health than men.**
- Life expectancy varies across groups: Asian Americans live about 84 years, while American Indian and Alaska Native populations average 64 years.
- This **20-year disparity** reflects differences in preventive care, healthcare access, and economic conditions.

Healthcare longevity looks at three main metrics to close the gaps and level the playing field in healthy aging—and these shape both new treatments and where investors put their money:

Lifespan

Refers to the total duration of an individual's life in years. Ongoing advancements in gene therapy and regenerative medicine are expanding these limits by countering the typical physiological declines associated with aging.



Healthspan

Denotes the portion of life spent in robust health and independence, unburdened by chronic diseases. It emphasizes proactive strategies, such as optimizing metabolic and hormonal functions, to prevent issues from developing.

Brainspan

Emphasizes sustaining cognitive sharpness and mental agility. It centers on combating neurodegenerative processes to help individuals remain productive and maintain a high quality of life as they grow older.

BACKGROUND INFORMATION: LIFESPAN AND HEALTHSPAN

Lifespan is the total duration of a person's life, and while extending it remains elusive, research is rapidly advancing.

- Scientists are leveraging gene-editing tools like CRISPR and regenerative therapies such as stem cells to slow or reverse aging.
- Altos Labs focuses on cell rejuvenation, developing senoblockers to manage aging cells, exploring epigenetic reprogramming and stem cell treatments for neurodegenerative diseases, and nearing clinical trials.
- Retro Biosciences aims to add ten years of healthy life through approaches like enhancing autophagy, plasma exchange, T-cell rejuvenation, and cell reprogramming, with some methods already in early human studies.
- NewLimit works to reverse cellular aging using epigenetic reprogramming via mRNA-delivered transcription factors, helping older cells act young again, with human trials expected soon.

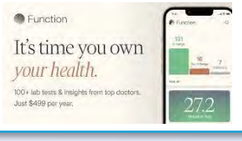
Healthspan focuses on living longer with vitality—staying active, independent, and healthy rather than simply adding years.

- According to the American Heart Association, improving diet, exercise, and daily habits can add up to 14 quality years of life.
- New therapies such as senolytics, which clear aging and inflammatory cells, show promise in reducing frailty among older adults.
- Growing attention on healthspan is driving precision medicine, supported by AI wearables and biomarker tracking that personalize care and reduce medical costs.
- Devices like the Oura Ring and WHOOP MG monitor metrics such as metabolic health, cardiovascular age, and aging rate, offering customized coaching for longevity.
- InsideTracker analyzes blood and wearable data to tailor nutrition and lifestyle plans, while Function Health provides comprehensive biomarker testing and proactive longevity guidance.

ALTOS™

Retro BIOSCIENCES

NewLimit



BACKGROUND INFORMATION: BRAINSPAN

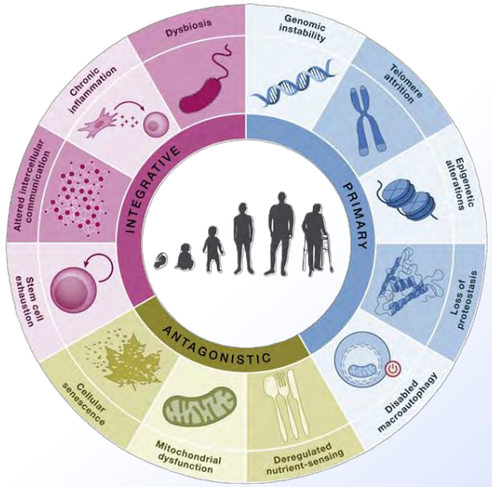
Brainspan reflects how long a person stays mentally sharp, creative, and productive with age. The brain often declines 5–10 years before the body, especially with diseases like Alzheimer's, reducing vital "thinking years."

- The focus centers on three goals: protecting brain cells, strengthening mental activity, and detecting problems early through data.
- Lecanemab (by Eisai and Biogen) targets amyloid plaques in Alzheimer's patients, slowing memory loss progression.
- Brain-training apps provide interactive cognitive exercises, while lifestyle improvements like exercise and diet enhance blood flow and mental clarity.
- The emerging model uses AI-driven monitoring to track brain health indicators and address risks proactively, much like a cognitive dashboard.
- Several big players, all with major private equity backing, are leading this effort:
  - **Cerevel Therapeutics** in Cambridge, MA (supported by Bain Capital Life Sciences and recently acquired by AbbVie for $8.7 billion) is making targeted drugs for brain disorders such as schizophrenia, Parkinson's, and Alzheimer's. Their late-stage oral medications aim to fix faulty neuron signaling, helping people maintain mental function longer and slow age-related cognitive decline.
  - **Acadia Healthcare**, based in Franklin, TN (launched with Bain Capital, now public but still attracting private equity), runs large clinic networks. They offer cognitive therapies and mental health care to fight age-related decline, including support for dementia and mood disorders. Their programs help people build brain resilience and stay independent.

BACKGROUND INFORMATION: HALLMARKS OF AGING

Understanding aging science is <u>key</u> to seeing why healthcare longevity is a major investment opportunity in 2025. Beyond lifespan, healthspan, and brainspan, investors should know the "hallmarks of aging" — core biological processes that drive bodily decline.

- First identified as nine hallmarks in 2013, this list expanded to twelve by 2023, according to research by López-Otín et al. in *Cell*. These include genomic instability, telomere attrition, and chronic inflammation, among others.
- The hallmarks reframe aging as a solvable biological challenge, guiding innovations that improve healthspan and brainspan while reducing risks of diseases like cancer, Alzheimer's, and diabetes.
- Linking this science to business reveals strong investment potential. In 2024, longevity-focused biotech firms drew about $8.5 billion across 331 deals, largely in the U.S. The trend continues in 2025, with investors shifting from large funding rounds to proven, value-driven technologies.



Prominent billionaires have collectively invested around $5 billion in longevity initiatives to date. Examples include:

- **Peter Thiel**, co-founder of **PayPal** and **Palantir Technologies**, who has invested in **Unity Biotechnology** (senolytics for age-related diseases) and the **Methuselah Foundation** (promoting longevity research).

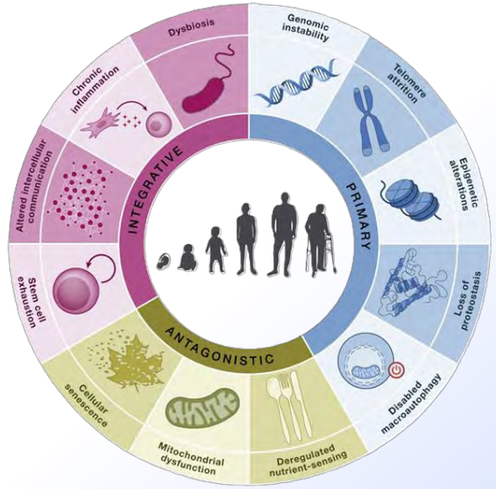
- **Sergey Brin**, co-founder of **Google** (**Alphabet Inc.**), who co-founded and funds **Calico Labs** (focusing on aging biology and therapeutics).

- **Vinod Khosla**, co-founder of **Sun Microsystems** and founder of **Khosla Ventures**, who has invested in **BioAge Labs** (developing drugs for aging-related conditions) and other longevity biotech firms.

- **For more information on specific Hallmarks and Longevity solutions, please refer to Appendix C.**

BACKGROUND INFORMATION: HALLMARKS OF AGING (CONT'D)

- Healthcare longevity is rapidly evolving, guided by core hallmarks of aging that shape R&D in areas like senolytics and epigenetic modulators.
- These breakthroughs have fueled major excitement, creating unicorns, IPOs, and major funding rounds — such as Retro Biosciences, which secured $180 million for cellular rejuvenation research.
- Investors are maintaining strong interest, recognizing that understanding the scientific hallmarks helps identify scalable, evidence-based anti-aging opportunities.
- In the past three years, private equity and venture capital have poured into the longevity sector. Here are some notable moves:
- **Major Private equity Investments:**
  - Denali Therapeutics (South San Francisco) focuses on neurodegeneration and CNS aging. Recently completed a $160M public offering (Dec 11, 2025) after $500M in PIPE financing (Feb 29, 2024).
  - Scholar Rock (Cambridge) develops treatments for neuromuscular and aging disorders, completing a $290M public offering (Oct 10, 2024).
- **Key Venture Capital Funding Rounds:**
  - BioAge Labs (Richmond, CA) leverages AI and genetics for longevity, raising $198M in an IPO (Sept 26, 2024) after a Series D led by Andreessen Horowitz (Feb 13, 2024).
  - NewLimit (South San Francisco) works on epigenetic reprogramming, raising $45M in a late stage VC Round (October 20, 2025) after a $130M Series B (May 6, 2025).



DENALI · ARCH Venture Partners · F/PRIME
Scholar Rock · ARCH Venture Partners · INVUS
BIOAGE · SV HEALTH INVESTORS · SANDS CAPITAL · orbimed
NewLimit · VALOR EQUITY PARTNERS

HALLMARKS OF AGING AND ASSOCIATED RISKS

Dysbiosis:
Gut microbiome imbalance; fuels inflammation, frailty.
Risks: Autoimmune diseases, metabolic disorders, mental health issues such as depression, colorectal cancer.

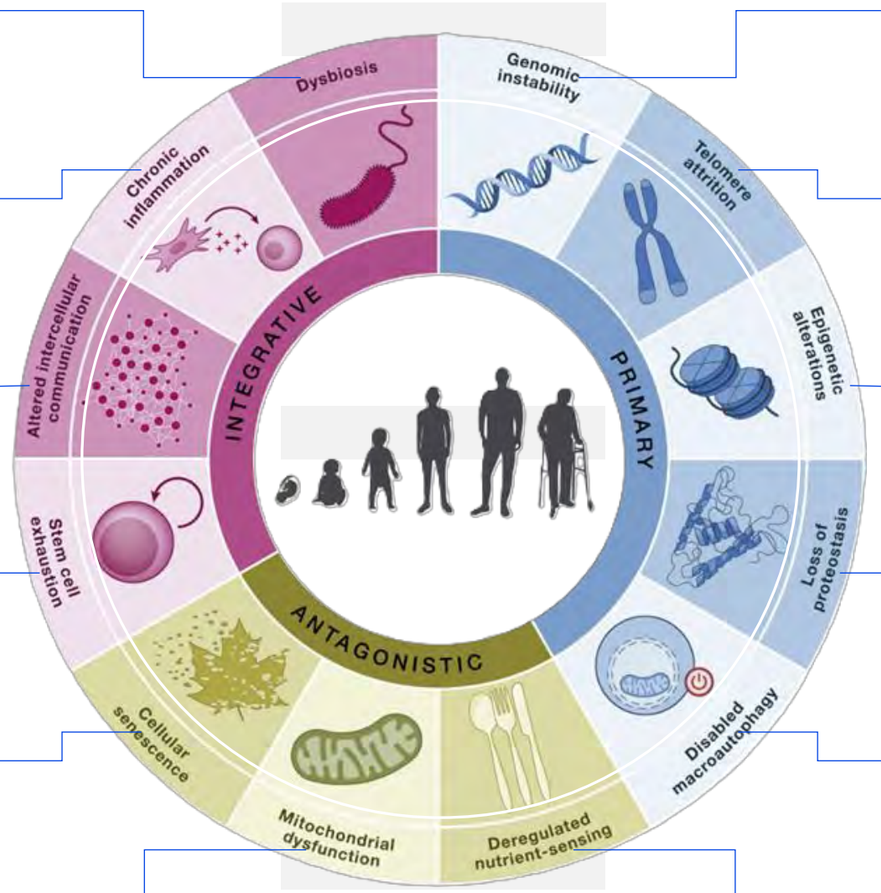
Chronic Inflammation (Inflammaging)
Persistent low-grade activation of inflammation; promotes vascular/organ diseases.
Risks: Heart disease, arthritis, diabetes, Alzheimer's, cancer.

Altered Intercellular Communication
Disrupts signaling; limits healthspan/brainspan.
Risks: Endocrine disorders, immune dysfunction, cancer, metabolic syndromes.

Stem Cell Exhaustion
Limits repair; weakens renewal processes.
Risks: Anemia, immune deficiencies, delayed wound healing, osteoporosis, sarcopenia.

Cellular Senescence
"Zombie" cells secrete SASP; fosters fibrosis, cancer risk.
Risks: Fibrosis, cancer, atherosclerosis, osteoarthritis, chronic kidney disease

Mitochondrial Dysfunction
Energy drop, ROS increase; deepens oxidative stress.
Risks: Cardiovascular diseases, neurodegenerative disorders such as Parkinson's, muscle weakness, diabetes.



Genomic Instability
DNA errors accumulate, causing cancer/mutations; erodes system integrity.
Risks: Cancer, mutations leading to genetic disorders, age-related diseases such as diabetes and cardiovascular conditions.

Telomere Attrition
Shortening limits replication; links to cardiovascular decline.
Risks: Cardiovascular diseases, cancer, immune system weakening, osteoporosis.

Epigenetic Alterations
Gene expression drifts; accelerates frailty.
Risks: Frailty, metabolic disorders, cancer, neurodegenerative diseases such as Alzheimer's.

Loss of Proteostasis
Misfolded proteins disrupt homeostasis; central to Alzheimer's.
Risks: Alzheimer's, Parkinson's, Huntington's, amyotrophic lateral sclerosis (ALS), cataracts.

Disabled Macroautophagy
Debris impairs proteostasis; exacerbates neurodegeneration.
Risks: Neurodegenerative diseases, metabolic disorders, cancer, liver and kidney dysfunction.

Deregulated Nutrient Sensing
Breakdowns (mTOR, AMPK) cause inefficiencies
Risks: Obesity, type 2 diabetes, cardiovascular disease, cancer.

For more information on specific Hallmarks and Longevity solutions, please refer to Appendix C.

Market Drivers and Recent Investment Activity

MARKET DRIVERS AND RECENT INVESTMENT ACTIVITY

Upon analysis of private equity and venture capital investments in longevity, one thing is clear—investors are moving in quickly.
There is genuine momentum is propelled by several core market drivers:

Demographic Pressure

Globally people are living longer, particularly in developed countries where life expectancy now exceeds 80. Meanwhile, there is a decline in fertility and families are having lesser children. The old model of everyone retiring at 65 no longer fits modern needs. More people want to stay healthy as they age—60% of consumers now say healthy aging is a top priority. This is driving funding into areas such preventive care and age-tech.

Scientific Maturity

Scientists have achieved real breakthroughs after decades of research in fields such as cellular interventions, epigenetics, and regenerative medicine. What once were lab theories are now real products—senolytics to remove damaged cells, NAD+ boosters that help delay disease and support cognitive function. These are no longer simply buzzwords anymore; products are moving out of the lab and into marketplaces and clinics.

Technology Convergence

Genomics, biosensors, and AI are advancing rapidly—much faster than anyone anticipated. What once took decades, such as understanding biology, developing new drugs, or personalizing treatments, now happens in years (or less with recent AI developments). AI-powered diagnostics and wearable devices are becoming widespread. Suddenly, the idea of living longer isn't just a fantasy; it's supported by real data and accessible to more people than ever before.

Capital Availability

Investors are clearly recognizing the opportunity. In 2024 alone, private funding reached $8.5 billion in Longevity, with no indication of slowing down in 2025. Major players—billionaires and venture capitalists—are all involved, and their investments are driving late-stage clinical trials and new technology platforms forward. This allows startups to join the field without enormous costs, shifting the sector from slow, costly R&D to much faster product launches.

MARKET DRIVERS AND RECENT INVESTMENT ACTIVITY: TRANSACTIONS OVER $50M (2023-2025)

There are substantial investments supporting companies advancing research and development throughout the industry. This table highlights some of the largest U.S. healthcare longevity deals **over $50 million** from 2023 to the present.

Sector	Subsector	Main Focus	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Epigenetic Reprogramming	Partial reprogramming to restore cell signaling and resilience	Retro Biosciences offers or has developed partial reprogramming technologies to restore cell signaling and resilience (Redwood City, CA)	N/A, **$1.18B** raised to date.	**$1.0B** Series A (May 21, 2025)	●Prosto Venture Club ●Sam Altman
Data & AI Systems	Real-time monitoring	Wearable health monitoring	ŌURA provides smart ring technology for tracking sleep, stress, and biomarkers to optimize healthspan. (San Francisco, CA; Helsinki, Finland)	**$11.0B** (post valuation)	**$907.70M** Series E (Oct 14, 2025)	●Fidelity Management & Research Company ●Iconiq Capital ●Atreides Management
Precision Diagnostics & Biomarkers	Predictive analytics	Personalized health platforms	Function Health delivers AI-based personalized preventive care for longevity interventions (Austin, TX)	**$2.5B** (post valuation)	**$300M** Series B (May 16, 2025)	●Andreesen Horowitz ●Matt Damon ●Zac Efron
Geroscience & Therapeutics	Anti-aging drugs	Alzheimer's treatment	Alzheon develops oral treatments to slow or stop Alzheimer's disease, addressing age-related neurodegeneration (Framingham, MA)	**$550M** (post valuation)	**$126.26M** Series E (Feb 10, 2025)	●Alerce Investment Management ●Thornapple River Capital (past)
Data & AI Systems	AI-driven health optimization	AI drug discovery	Insilico Medicine uses AI to discover drugs for age-related diseases and longevity enhancement (Boston, MA)	**$895M** (post valuation)	**$123M** Series E (Jun 16, 2025)	●Warburg Pincus ●Lilly Ventures ●Aramco Ventures
Nutrition & Preventive Lifestyle Optimization	Personalized nutraceuticals	Probiotics/prebiotics to rebalance microbiome via supplements	Pendulum Therapeutics offers or has developed targeted probiotic strains for metabolic health, like Akkermansia for gut barrier repair (San Francisco, CA)	**$391.00M** (post valuation)	**$101M** Series C (Feb 20, 2024)	●Sequoia Capital ●True Ventures ●Mayo Clinic
Geroscience & Therapeutics	Anti-aging drugs	Small molecule and ASO therapies targeting neurodegeneration in CNS diseases	SciNeuro targets neurodegeneration biology with therapies for Alzheimer's and Parkinson's to extend brainspan (Cambridge, MA)	N/A, **$153M** raised to date.	**$53M** Later Stage VC (Dec 4, 2025)	●Lilly Asia Ventures ●Arch Venture Partners

MARKET DRIVERS AND RECENT INVESTMENT ACTIVITY: TRANSACTIONS UNDER $50M (2023-2025)

Across the sector, funding continues to flow into innovative ventures that are redefining aging and healthcare. Even these smaller transactions underscore the momentum in the field. This table features some of the deals **under $50 million** from the same timeframe.

Sector	Subsector	Main Focus	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Anti-aging drugs	mTOR inhibitors	Aeovian Pharmaceuticals develops treatments for rare genetic and age-related human diseases (Berkeley, CA)	**$56.52M** (post valuation)	**$50.42M** Series A (May 13, 2024)	●Apollo Health Ventures ●Hevolution Foundation ●Soffinova Investments
Regenerative Medicine & Cellular Rejuvenation	Tissue engineering	Encapsulated stem cell-derived liver tissues for acute liver failure treatment	Morphocell advances liver tissue therapies using stem cells for regenerative medicine in age-related organ failure (Cambridge, MA; Montreal, Canada)	N/A, **$50M** raised to date.	**$50M** Series A (Dec 1, 2025)	●CDP Venture Capital (Rome) ●Genson Capital ●Invesstisement Quebec
Hormonal & Reproductive Longevity	Hormone optimization	Telehealth platform for hormonal optimization	Midi Health provides AI-driven preventive care for women's hormonal and reproductive longevity, including menopause management (Menlo Park, CA)	**$500M** (post valuation)	**$50M** Series C (Oct 2, 2025)	●Advance Venture Partners
Nutrition & Preventive Lifestyle Optimization	Metabolic interventions	Fasting mimicking diets	L-Nutra offers nutrition programs like Fasting Mimicking Diets to enhance healthspan and combat age-related diseases (Los Angeles, CA)	**$400M** (post valuation)	**$47M** Series D2 (Nov 7 2023)	●Brentwood Associates ●Portfolia
Geroscience & Therapeutics	Epigenetic reprogramming	Cell reversal therapies	NewLimit specializes in epigenetic reprogramming to restore youthful function in aged cells (San Francisco, CA)	**$810M** (post valuation)	**$45M** Early Stage VC (Oct 20, 2025)	●Eli Lilly ●Kivu Ventures ●Human Capital Partners
Hormonal & Reproductive Longevity	Reproductive health	Stem cell fertility therapies	Gameto applies stem cell technology to address ovarian aging and improve reproductive healthspan (Austin, TX)	**$243M** (post valuation)	**$44M** Series C (Aug 12, 2025)	●Portfolia ●Bold Capital Partners ●RA Capital Management
Geroscience & Therapeutics	Cellular interventions	Senolytics	Rubedo Life Sciences designs senotherapeutics to clear senescent cells and mitigate aging effects (Sunnyvale, CA)	**$200M** (post valuation)	**$40M** Series A (Jul 24, 2024)	●Khosla Ventures ●Hevolution Foundation ●Ahren Innovation Capital
Clinical Delivery Models	Longevity Clinics and Integrated Platforms	Genomic sequencing and AI-driven longevity assessments	Human Longevity Inc. is a genomic-based health intelligence company empowering proactive healthcare and personalized longevity programs. (San Diego, CA)	**$250M** (post valuation)	**$39.8M** Series B (Aug 21, 2024)	●TVM Capital Healthcare Partners ●Panacea Venture ●Broad Oak Capital Partners

Key Longevity Sectors

KEY LONGEVITY SECTORS

We have identified six (6) key longevity sectors—defined here as distinct investment domains within the broader longevity landscape—for consideration, each at varying stages of maturity despite robust market activity across the board. In this paper, we will be highlighting spots that are particularly lively—where innovation, activity, and growth are all converging. For each of the following six sectors, we will provide a brief overview of the sector and then explore some promising opportunities, with a focus on emerging and lower middle markets. **At this time, we are seeing Clinical Delivery Models in Longevity emerging in the form of Longevity Clinics.**

Clinical Delivery Models

Longevity clinics

Geroscience & Therapeutics

Anti-aging drugs and cellular interventions

Precision Diagnostics & Biomarkers

Biological age testing and predictive analytics

Data & AI Systems

AI-driven health optimization and predictive modeling

Psychological & Behavioral Health

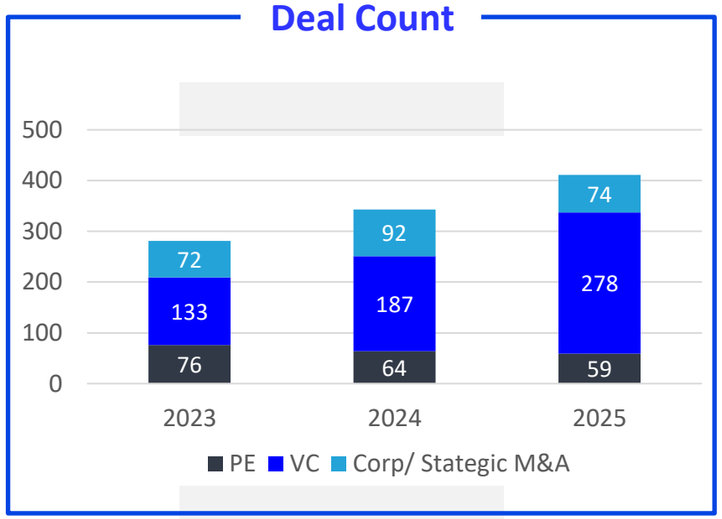
Mental wellness and cognitive enhancement

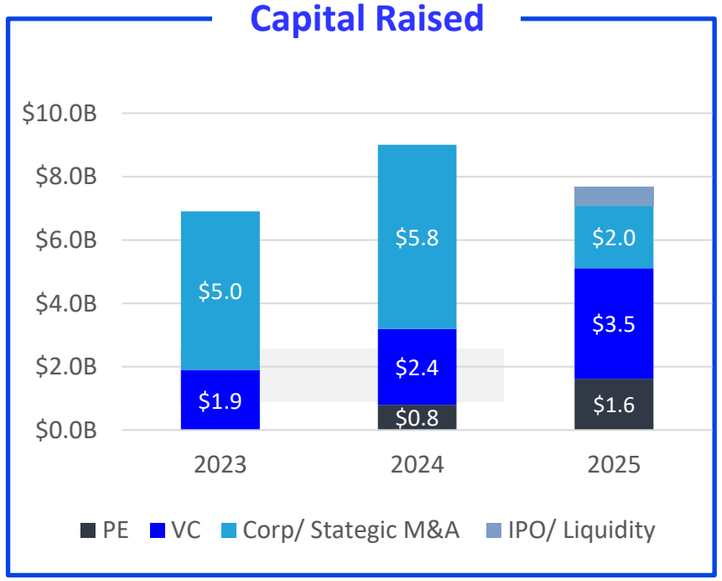
Hormonal & Reproductive Longevity

Hormone optimization and reproductive health

KEY LONGEVITY SECTORS: CLINICAL DELIVERY MODELS

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
griffin concierge medical	Concierge longevity clinic offering hormone optimization, preventive care, regenerative therapies, and healthspan extension	Tampa, FL	REVELSTOKE CAPITAL PARTNERS	PE Growth / Expansion	Undisclosed	Sep-30-2025
NOVELLUM LONGEVITY	MSO for longevity and functional medicine clinics, providing precision diagnostics, regenerative medicine, and hormone optimization..	Miami, FL	PLATT PARK CAPITAL PARTNERS	Platform Creation	Undisclosed	Jul-29-2025
AHONE	Hormone-driven longevity care for sustained vitality and health span.	New York, NY	Gaingels, TRIBE CAPITAL	Series A	$ 33 M	Jan-30-2025
Agentis Longevity	Healthcare platform offering personalized longevity services with cutting-edge science for optimal health and vitality.	Nashville, TN	SHORE Capital Partners	Platform Creation	Undisclosed	Aug-22-2024
HUMAN LONGEVITY	Genomic sequencing for personalized health optimization.	San Diego, CA	PANACEA VENTURE, TVM Capital HEALTHCARE	Series B	$ 39.8 M	Aug-21-2024

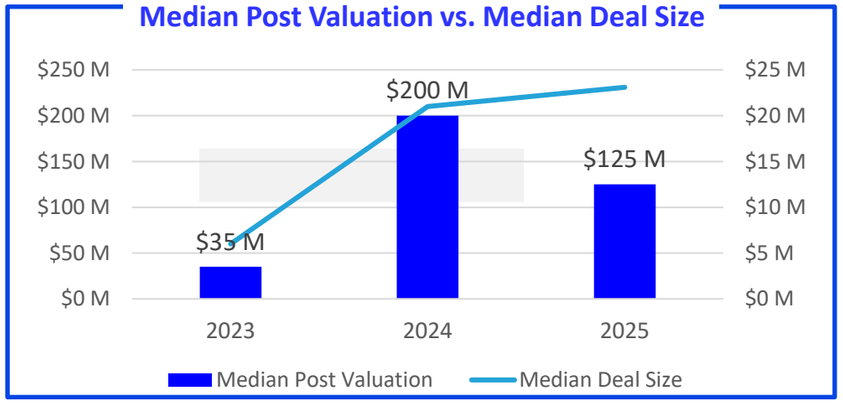




- Funding in longevity clinics has seen remarkable growth, with both deal activity and capital raised increasing significantly from 2022 to 2025.
- Venture capital and corporate strategic investments dominate, highlighting a shift toward scalable, tech-driven health models and accelerating industry consolidation, as innovation and preventive wellness care attract major investment.

KEY LONGEVITY SECTORS: CLINICAL DELIVERY MODELS

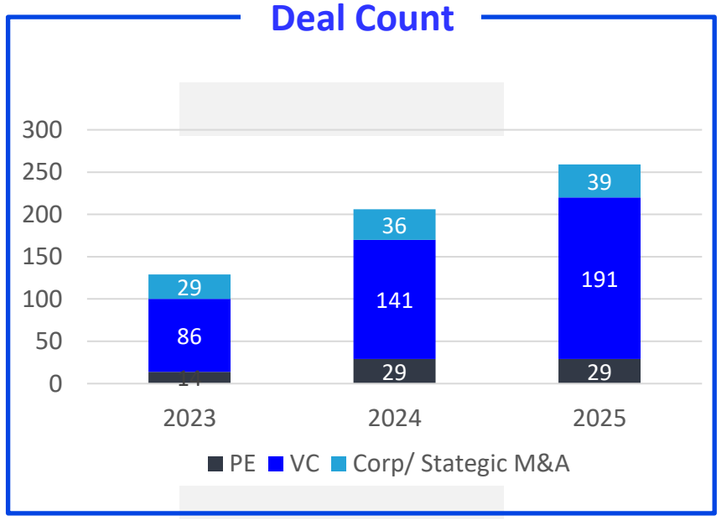
Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
Generation Lab	Longevity diagnostics for personalized age reversal.	San Francisco, CA	Accel, Samsung Next	Seed	$ 11 M	Oct-23-2025
Fountain Life	AI-powered longevity clinics.	Orlando, FL	nimble, Eos Venture Partners	Series B	$ 18 M	Aug-13-2025
circulate	Longevity plasma exchange for biological age reversal.	Seattle, WA	CSC Upshot Ventures, Khosla Ventures	Seed	$ 12 M	Jun-30-2025
Humanaut Health	Diagnostics (DEXA/ Hormones) and Regenerative Therapies	Nashville, TN & Naples, FL	Midnight Venture Partners	Seed	$ 8.7 M	May-7-2024
Parsley Health	Functional medicine for longevity.	New York, NY	Gaingels, Kinnevik	Series C	$ 32 M	Jan-30-2024

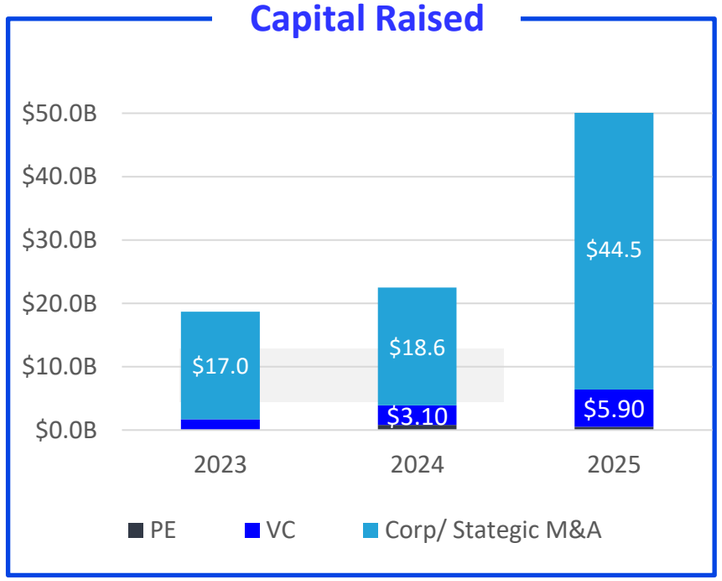


- **Market Correction & Discipline**:
  After 2024's peak, median valuations normalized to ~$120M in 2025 with deal sizes settling around $18M, signalling a return to disciplined investment.
- **Shift to Science & Emerging Hubs**:
  Capital is prioritizing seed-stage therapeutic startups (e.g., plasma exchange, regenerative medicine) in Tier-2 markets such as Nashville and Orlando, moving away from generalist service models in saturated coastal cities.

KEY LONGEVITY SECTORS: GEROSCIENCE AND THERAPEUTICS

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
NewLimit	Partial reprogramming therapies to slow or reverse cellular aging.	San Francisco, CA	Lilly, boostVC	Early Stage VC	$ 45 M	Oct-20-2025
Beam Therapeutics	Base-editing gene therapies for precise DNA correction.	Cambridge, MA	Undisclosed	Private Investment	$ 500 M	Mar-10-2025
Retro Biosciences	Rejuvenation drugs targeting aging pathways and cellular repair.	San Francisco, CA	PROSTO VC	Series A	$ 1 B	Jan-23-2025
BIOAGE	AI-driven discovery of longevity drugs from human aging data.	Richmond, CA	Undisclosed	IPO	$ 198 M	Sep-26-2024
ALTOS	Cell rejuvenation and reprogramming for regenerative medicine.	Redwood City, CA	General Catalyst, Mubadala Capital	Development Capital	$ 1.49 B	Feb-15-2024

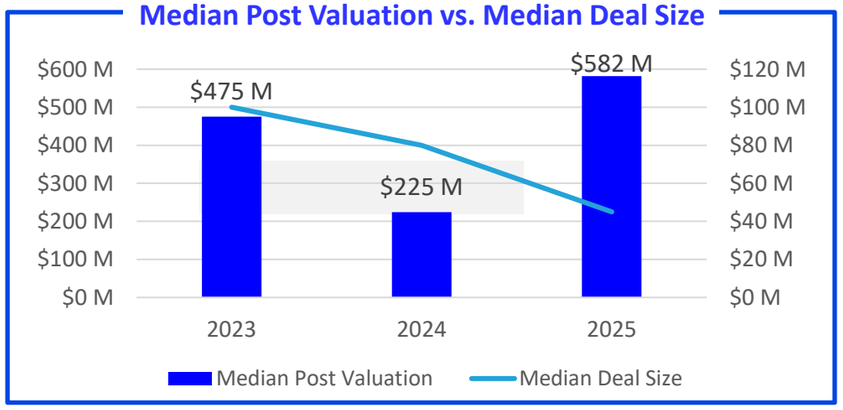




- **Geroscience Mega-Rounds & Platform Plays:** Geroscience is attracting outsized, late-stage capital with marquee financings, while deal counts and total capital raised climb steadily, as investors concentrate on platform companies in San Francisco, Cambridge, Richmond, and Redwood City that combine gene editing, partial reprogramming, AI-driven target discovery, and cell rejuvenation to reshape aging biology..

KEY LONGEVITY SECTORS: GEROSCIENCE AND THERAPEUTICS

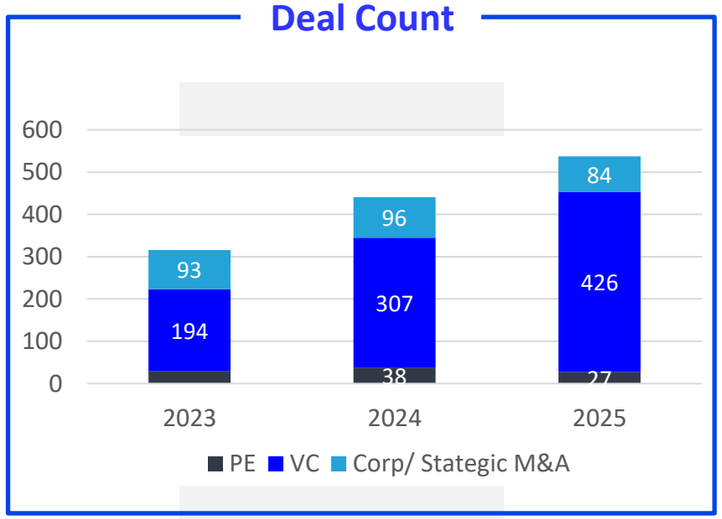
Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
Rubedo	Senolytic small molecules to selectively clear aged cells.	Sunnyvale, CA	khosla ventures, Ahren	Series A	$ 40 M	July-25-2024
JUNEVITY	Geroscience platforms for extending healthy lifespan.	San Francisco, CA	GOLDCREST CAPITAL	Seed	$ 10 M	May-22-2025
CENTURY THERAPEUTICS	iPSC-derived immune cell therapies for cancer.	Philadelphia, PA	BainCapital LIFE SCIENCES, venrock	Private Investment	$ 60 M	Apr-15-2025
celsius	Single-cell genomics for precision immunology therapies.	Cambridge, MA	abbvie	Acquisition	$ 250 M	June-27-2024
turn.bio	mRNA-based epigenetic reprogramming for tissue rejuvenation.	Mountain View, CA	khosla ventures, astellas	Series A	$ 29 M	May-10-2024

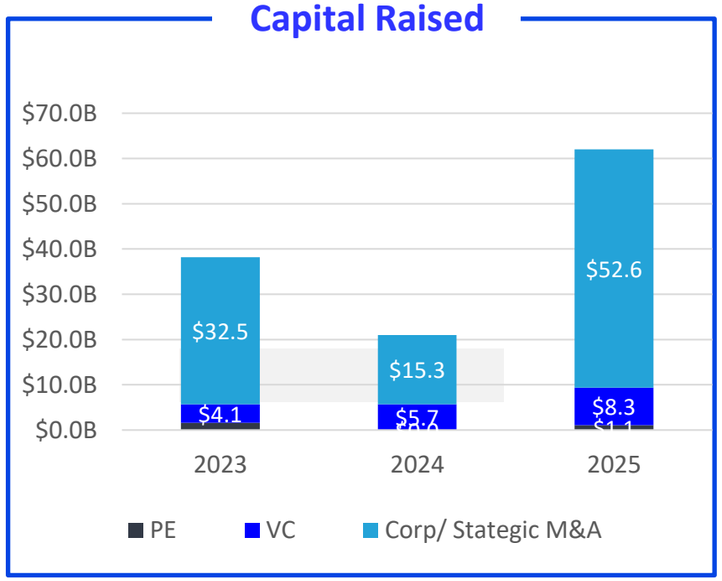


- **Longevity Upside & Bigger Rounds:**
  After a softer 2024, median post-money valuations in lower-middle-market geroscience rebounded sharply in 2025, with deal sizes ticking up, as investors backed platforms extending healthy lifespan via senolytics, iPSC immunotherapies, single-cell genomics, and mRNA rejuvenation.
- **Shift to Frontier Biology in Tech Hubs:**
  Capital is concentrating in early-stage therapeutics across Sunnyvale, San Francisco, Philadelphia, Cambridge, and Mountain View, favoring deep biology and cell-engineering startups over traditional small-molecule plays in crowded oncology or primary care.

KEY LONGEVITY SECTORS: PRECISION DIAGNOSTICS AND BIOMARKERS

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
BILLION TO ONE	Single-gene non-invasive prenatal and fetal RhD testing	Menlo Park, CA	Undisclosed	IPO	$ 273 M	Nov-06-2025
BAYLOR GENETICS	Multi-omics genomic diagnostics for rare disease.	Houston, TX	DECHENG CAPITAL	Series A	$ 102 M	Mar-31-2025
Geneoscopy	Stool RNA biomarkers for colorectal cancer screening.	Saint Louis, MO	BIO-RAD, MERCYHEALTH	Series C	$ 105 M	Jan-08-2025
IDEAYA BIOSCIENCES	Synthetic lethality–based precision oncology drugs.	San Francisco, CA	Undisclosed	IPO	$ 253 M	July-10-2024
natera	Tumor-informed ctDNA blood tests for cancer monitoring.	Austin, TX	Undisclosed	IPO	$ 250 M	Sep-07-2023

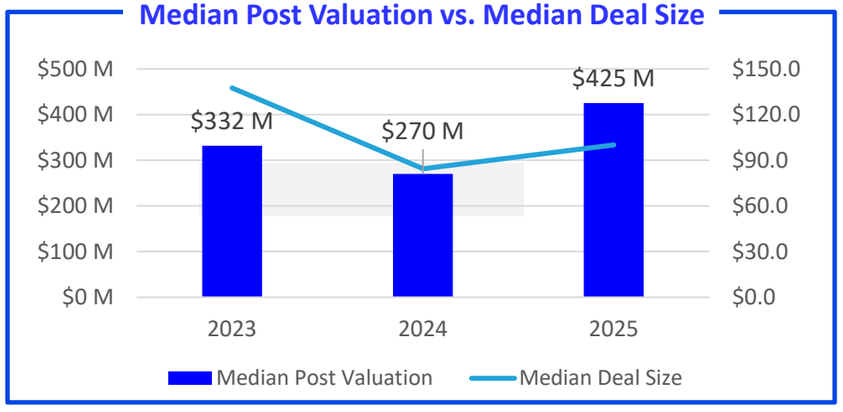




- **Precision Diagnostics Scale-Up & IPO Pathways:** Precision diagnostics is attracting larger late-stage rounds and IPOs, with financings ranging from roughly $100M Series A–C raises to $250M+ public offerings, while both deal counts and total capital raised are rising sharply as investors back multi-omics, ctDNA monitoring, and stool RNA biomarker platforms to anchor next-generation cancer and prenatal testing infrastructure.

KEY LONGEVITY SECTORS: PRECISION DIAGNOSTICS AND BIOMARKERS

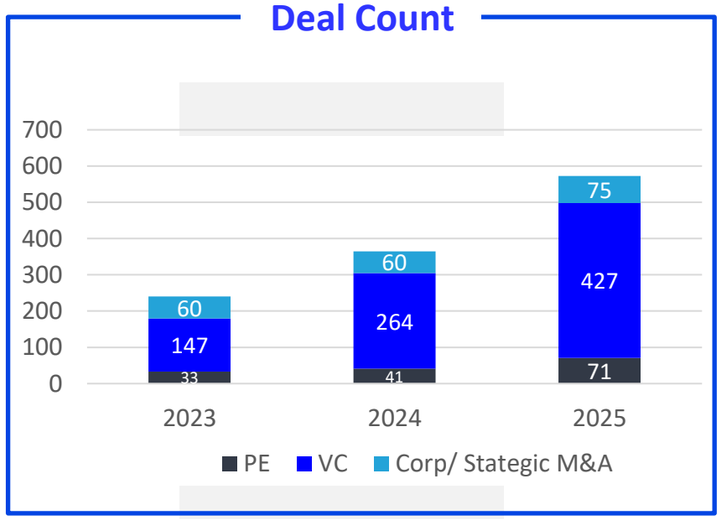
Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
ClevelandDx	Structural protein PSA testing for prostate cancer risk.	Cleveland, OH	SSVP Serial Stage Venture Partners	Series E	$ 14.4 M	Oct-20-2025
GATC Health	AI systems biology for drug discovery and risk prediction.	Irvine, CA	West Virginia Jobs Investment Trust	Later Stage VC	$ 26 M	Sep-15-2025
Imagene	AI-powered pathology for oncology biomarker detection.	Miami, FL	Larry Ellison	Series B	$ 23 M	July-01-2025
Inflammatix	Immune-response signatures for rapid sepsis detection.	Sunnyvale, CA	khosla ventures, think health	Series E	$ 57 M	Sep-12-2024
C2i Genomics	Tumor-derived genomic signals for ultra-sensitive cancer detection.	New York, NY	veracyte	Acquisition	$ 100 M	Feb-05-2024

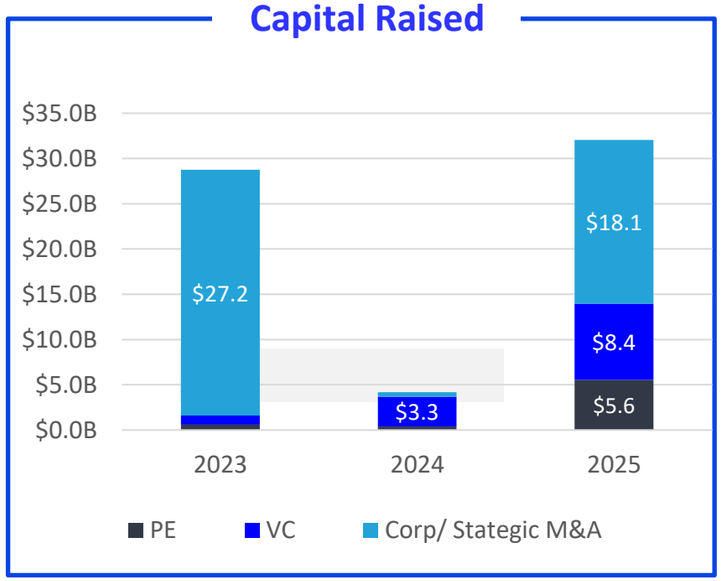


- **Market Rebound & Bigger Tickets:**
  After a dip in 2024, median post valuations and deal sizes in lower-middle-market precision diagnostics and biomarkers climbed again in 2025, with rounds approaching the low nine figures, signalling renewed confidence in high-specificity testing and oncology-focused platforms.
- **Shift to AI Biology & Regional Nodes:**
  Capital is backing AI-powered biology, immune-response signatures, and tumor-derived genomic signal companies across Cleveland, Irvine, Miami, Sunnyvale, and New York, favoring differentiated biomarker engines in diverse regional hubs over broad, commoditized lab services in legacy centers.

KEY LONGEVITY SECTORS: DATA AND AI SYSTEMS

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
iodine	AI clinical data for care and revenue.	Austin, TX	WAYSTAR	Acquisition	$ 1.25 B	Oct-01-2025
twin health	Whole Body Digital Twin technology for reversing chronic metabolic dysfunction.	Mountain View, CA	MAJ INVEST, TEMASEK	Series E	$ 53 M	Aug-21-2025
Insilico Medicine	Generative AI for longevity drug discovery.	Cambridge, MA	WARBURG PINCUS, LILLYVENTURES	Series E	$ 123 M	June-16-2025
BostonGene	Multi-omic profiling for cancer and immune health.	Waltham, MA	NEC	Series B	$ 120 M	Dec-05-2024
TEMPUS	Intelligent diagnostics and multimodal data integration for personalized precision medicine.	Chicago, IL	Undisclosed	IPO	$ 410.7 M	June-14-2024

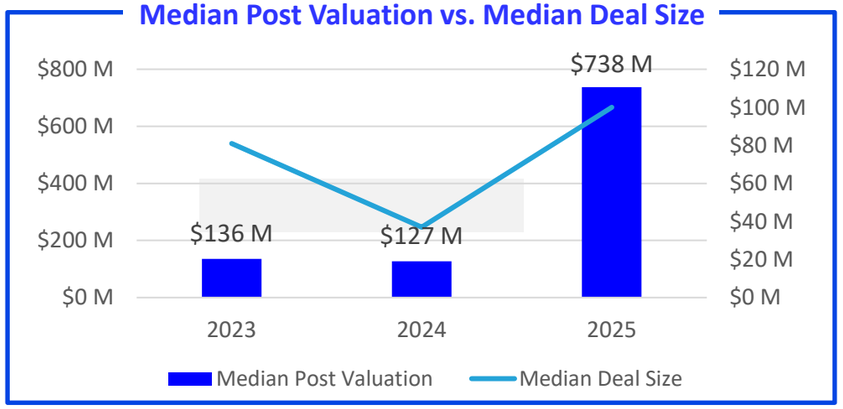




- **Data & AI Systems Scale-Up**: Surging activity in AI-native healthcare platforms—from multimodal diagnostics and whole-body digital twin tech to multi-omic cancer profiling—is driving larger late-stage financings alongside rising annual deal counts and capital raised, signaling that investors are backing data-rich, clinically embedded infrastructure as core rails for precision medicine and long-term drug discovery.

KEY LONGEVITY SECTORS: DATA AND AI SYSTEMS

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
VIOME LIFE SCIENCES	AI microbiome nutrition for disease prevention.	Bellevue, WA	BOLD CAPITAL PARTNERS, khosla ventures	Series D	$ 25.4 M	Aug-27-2024
HiLabs	AI data refinement for clinical insight.	Bethesda MD	EIGHT ROADS, F/PRIME	Series B	$ 39 M	Mar-11-2024
eClinical Powered by elluminate	Unified clinical data platforms for accelerating digital trial timelines.	Mansfield, MA	GI PARTNERS	Acquisition	Undisclosed	Sep-12-2025
covera health	AI-enabled radiology analytics for better diagnostics	New York, NY	INSIGHT PARTNERS, Green Meadow	Series C	$ 50 M	Nov-01-2023
AMPEL BIO SOLUTIONS LLC	Machine learning and RNA analytics for autoimmune precision	Charlottesville, VA	Coddle Creek Capital	Later Stage VC	$ 1.8 M	July-06-2023

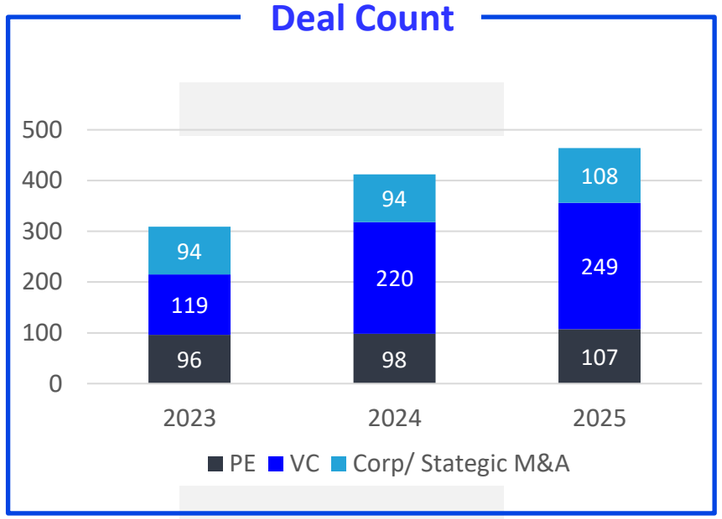


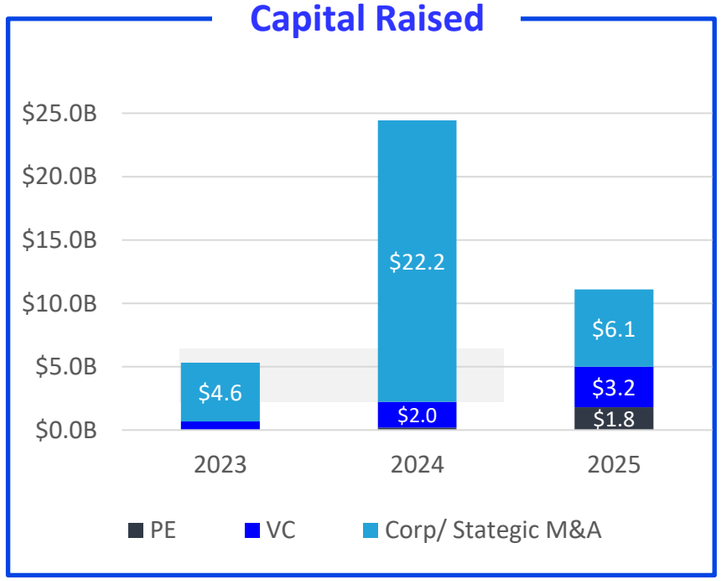
- **Market Correction & Discipline:**
  After 2024's softness, median post valuations rebounded toward the high hundreds of millions in 2025, while typical deal sizes rose into low nine figures as capital concentrated into fewer, scaled platforms. Investor budgets expanded alongside measurable AI ROI, reinforcing disciplined deployments into proven models.

- **Shift to Deep Tech & New Nodes:**
  Funding is gravitating to AI-driven diagnostics, clinical workflow, and molecular data platforms, not generic tools. Capital is diffusing beyond legacy hubs as mature, data-rich assets attract mega-deals across varied U.S. locales.

KEY LONGEVITY SECTORS: PSYCHOLOGICAL AND BEHAVIOR HEALTH

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
Quartet	AI-driven behavioral health coordination for value-based mental health care.	New York, NY	NEUROFLOW	Acquisition	Undisclosed	Jan-29-2025
cerevel	Precision psychiatry platform targeting neurotransmitter mechanisms in treatment-resistant conditions.	Cambridge. MA	abbvie	Acquisition	$ 8.3 B	Aug-01-2024
Talkiatry	Telepsychiatry platform with AI-assisted clinical workflows and direct-to-consumer access.	New York, NY	ANDREESSEN HOROWITZ, LEFT LANE	Series C	$ 130 M	June-20-2024
KARUNA THERAPEUTICS	Precision neuroscience for antipsychotic innovation in psychotic disorders.	Boston, MA	Bristol Myers Squibb	Acquisition	$ 13.79 B	Mar-18-2024
Cognito Therapeutics	AI-powered closed-loop digital therapeutics for cognitive disorders.	Cambridge, MA	FoundersX FUND THE FUTURE, IAG CAPITAL PARTNERS	Series B	$ 129 M	Nov-15-2023

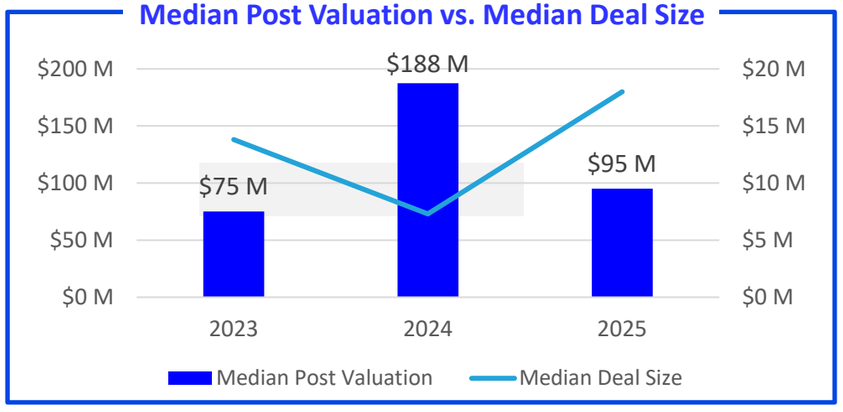




- **AI-Enabled Psychiatry & Digital Therapeutics Upswing:** Investors are scaling exposure to precision psychiatry and digital mental health, backing platforms that span neurotransmitter-targeted therapeutics, AI-assisted telepsychiatry, and closed-loop cognitive digital therapeutics, with landmark outcomes including multi-billion-dollar acquisitions and $100M+ growth rounds.

KEY LONGEVITY SECTORS: PSYCHOLOGICAL AND BEHAVIOR HEALTH

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
valerahealth	Digital mental health platform with AI clinical decision support.	New York, NY	Gaingels, MedStartr Venture Fund	Series A	$ 9.6 M	Jan-13-2025
heading	AI analytics for real-time mental health outcomes measurement and optimization..	Austin, TX	GRØN VENTURES, JAM FUND	Series A	$ 4.5 M	Aug-13-2025
rune labs	Neurology data analytics for movement disorders and real-world monitoring.	San Francisco, CA	daybreak PARTNERS	Later Stage VC	$ 11.2 M	Jun-30-2025
rippl care	AI-driven mental health workflow automation and care coordination.	Seattle, WA	G/, F/PRIME	Series A	$ 23 M	May-7-2024
CONNECTIONS Health Solutions	Behavioral health and substance use disorder management with AI assessment and matching..	Phoenix, AZ	town hall VENTURES	Development Capital	$ 28 M	Oct-05-2023

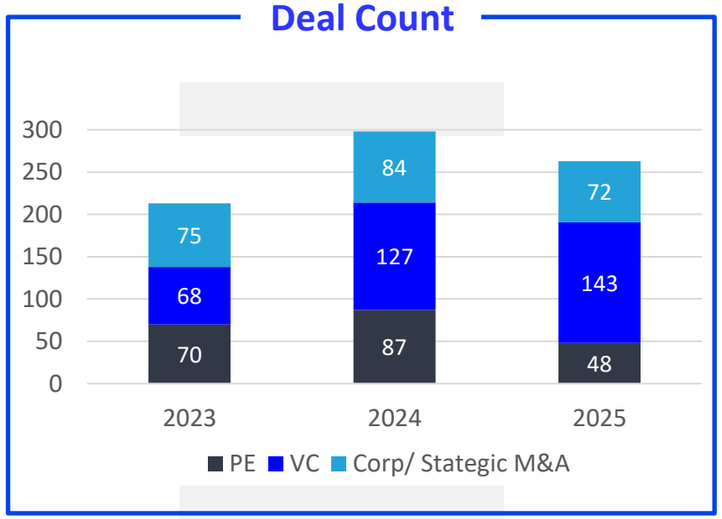


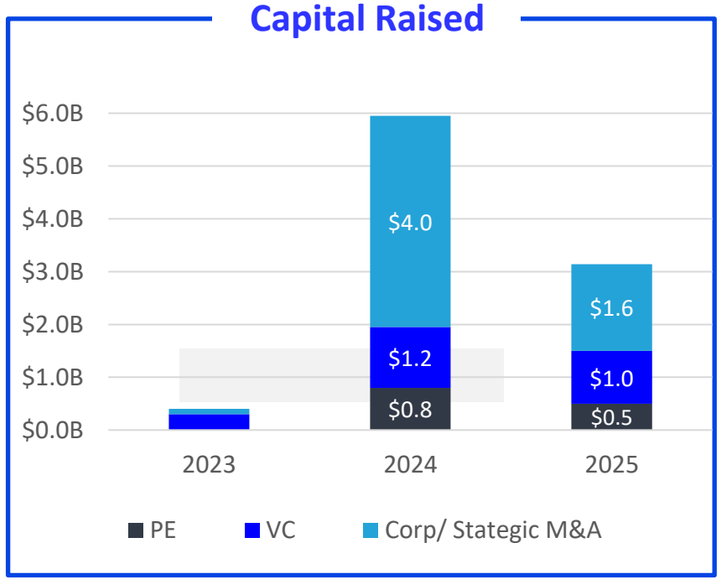
- **Lower-Middle Market Reset & Selectivity:**
  Following 2024's spike in valuations, lower-middle market psychological health deals saw median post-money levels ease in 2025 while median deal sizes held in the mid-teens, reflecting greater selectivity around product-market fit and reimbursement traction.

- **AI-Driven Care in Distributed Hubs:**
  Capital is concentrating in AI-native mental health workflow and analytics platforms in secondary tech hubs such as Austin, Seattle, Phoenix, and New York, favoring targeted workflow automation and outcomes measurement over broad, non-differentiated telehealth models.

KEY LONGEVITY SECTORS: HORMONAL AND REPRODUCTIVE LONGEVITY

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
Alydia Health	Hemorrhage-control devices for safer childbirth.	Menlo Park, CA	Laborie – For Dignity. For Life.	Acquisition	465 M	Nov-07-2025
Midi	Virtual menopause and midlife hormonal care for women.	Los Angeles, CA	AVP	Series C	50 M	Oct-10-2025
gameto	Cell engineering for next-generation fertility treatments.	Austin, TX	Overwater Ventures	Series C	44M	Aug-08-2024
gynesonics	Minimally invasive devices for fibroid symptom relief.	Redwood City, CA	HOLOGIC	Acquisition	350 M	Jan-1-2025
MAVEN	Virtual clinic for comprehensive women's and family health.	New York, NY	General Catalyst, Sequoia	Series F	125 M	Aug08-2024

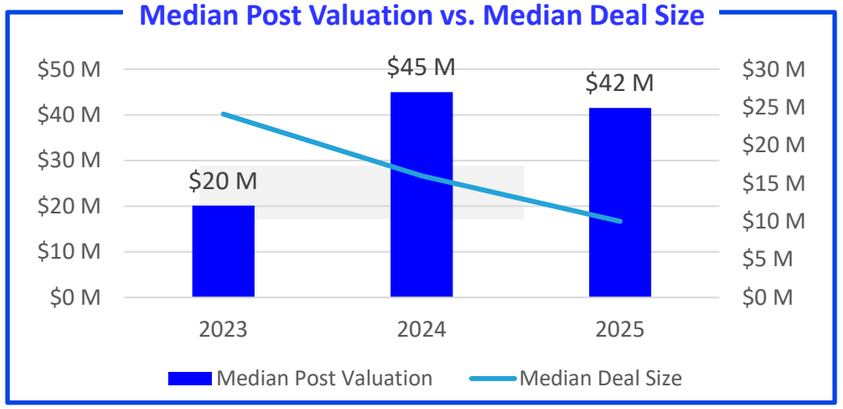




- **Market Maturity & Premium Outcomes:** Hormonal and reproductive longevity is entering a mature phase, with fewer but larger late-stage financings and headline exits, as capital concentrates in scaled, clinically integrated women's health platforms across bi-coastal hubs such as Menlo Park, Los Angeles, Austin, Redwood City, and New York.

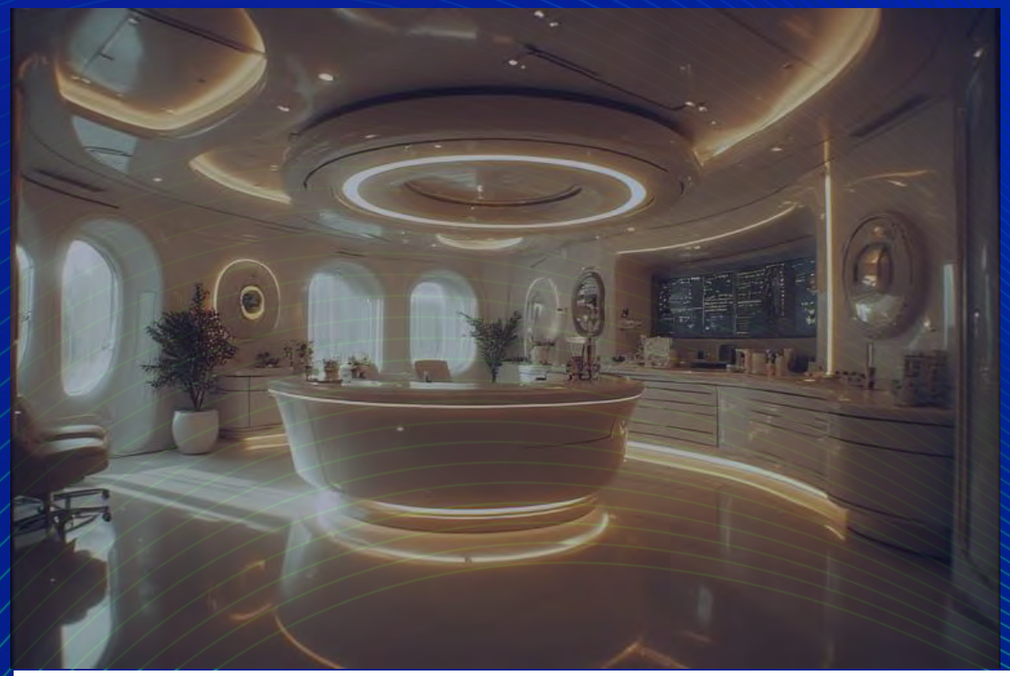
KEY LONGEVITY SECTORS: HORMONAL AND REPRODUCTIVE LONGEVITY

Company	Description	Location	Investors	Financing Stage	Latest Amount	Date
Visana	Digital platform for endometriosis and pelvic pain management.	Minneapolis, MN	The Cigna Group Ventures, Flare Capital Partners	Series A	$ 24 M	Aug-13-2025
OVIVA Therapeutics	Hormone-based therapies for ovarian and reproductive longevity.	New York, NY	GranataBio	Acquisition	Undisclosed	Apr-29-2025
bloomlife	Connected maternal health monitoring for pregnancy insights.	San Francisco, CA	gather Ventures, Foreground Capital	Series B	$ 4.45 M	Mar-21-2025
MANTALITYHEALTH	Hormone optimization services for men's health and vitality.	Chesterfield, MO	Agentis Longevity	Acquisition	Undisclosed	Aug-22-2024
minerva The Uterine Health Company	Endometrial ablation technology for heavy menstrual bleeding.	Santa Clara , CA	accelmed, NEA	Private Placement	$ 30 M	Feb-09-2023



- **Fertility Valuations Drift Down, Deals Hold:**
  After a valuation bump in 2024, lower-middle market women's health and reproductive longevity deals saw median post-money levels ease slightly in 2025 while median deal sizes stayed in the mid-teens, indicating more cautious pricing but steady capital deployment into proven models.

- **Focus on Devices & Distributed Care:**
  Capital is targeting differentiated fertility and maternal-health devices and platforms across Minneapolis, New York, San Francisco, St. Louis, and Santa Clara, favoring clinically integrated, hardware-enabled solutions over broad, undifferentiated wellness offerings.



Longevity Clinics – A Maturing Market

Longevity Clinics: Philosophy, Challenges, and Scaling Strategies

Longevity clinics evolve traditional healthcare by adopting a preventative measures first philosophy that optimizes biomarkers to ideal levels without waiting for diagnoses, potentially serving as primary care with integrated specialists. This contrasts with regular clinics' reactive approach and medspas' service-based model, emphasizing activity, muscle health, and social connections for long-term vitality. Industry leaders stress robust clinical frameworks and data integration to overcome barriers like insurance limitations and ROI proof, paving the way for value-based expansion.

- **Philosophy vs. Traditional Clinics:** Emphasis (almost “aggressive”) prevention without diagnostic barriers, recommending FDA-approved interventions.
  - **Biomarker Optimization:** Targets ideal levels (e.g., LDL/HDL, sugar control) to prevent issues like pre-diabetes early.
    Regular clinics require a diagnosis before treatment; longevity pushes proactive care if patients pay, focusing on root causes.
  - **Evolution to Primary Care:** Incorporates specialists for comprehensive support, emphasizing muscle building, high-protein diets, and social wellness.
    Aligns with principles for active aging, integrating mental health and optional advanced scans like angiograms or Prenuvo MRIs.

- **Scaling Accessibility and Challenges:** Insights and recommendations from healthcare industry providers on bridging gaps for broader adoption.
  - **Employer and Insurance Integration:** Incorporating services into benefits packages and life insurance riders for expanded reach.
    Employer perks yield healthier staff, reduced absenteeism, and better retention via biomarker screenings; insurance uses wearables for risk assessment and premium discounts
  - **Capital and ROI Barriers:** "Chicken-and-egg" dilemma requiring clear evidence of outcomes to attract private equity.
    Without initial funding, proving financial yields is tough; shift to employer/government-supported value-based frameworks blends preventive tech with robust data.
  - **Flexible Savings and Prevention Models:** Embed longevity goals into insurance products with savings mechanisms rewarding preventive actions, such as app-based tracking of metabolic health.
    Aegon’s longevity revolution strategies promote bundled products where policyholders access clinic discounts, fostering long-term engagement and risk reduction through data analytics.
  - **Insurtech Innovations for Incorporation:** Leverage AI-driven platforms to personalize policies based on real-time health data from wearables and biomarkers.
    Digital care ecosystems, like those from Pep Health, integrate longevity services with insurers for predictive preventive incentives, offering dynamic premium adjustments tied to healthspan metrics.

LONGEVITY CLINICS: MONETIZATION STRATEGY

- At the core of these platforms' business models is a reliance on cash-pay structures, where patients cover services out-of-pocket rather than through insurance, enabling higher profitability and operational flexibility.
- This approach sidesteps reimbursement delays, administrative burdens, and low-margin payer contracts typical in traditional healthcare, allowing clinics to achieve 15-30% EBITDA margins through premium pricing aligned with personalized, high-value outcomes. Revenue streams often include:

Membership and Subscription Models with Concierge Services

Platforms generate recurring income via monthly or annual fees for ongoing access to hormone optimization, vitality testing, and coaching, and concierge elements such as dedicated physicians, priority scheduling, and 24/7 support, fostering patient retention and predictable cash flow. This transforms episodic visits into community-based care, with low churn when supported by data-driven protocols

Premium Treatment Packages

Clinics offer high-end packages integrating AI-driven diagnostics, genetic profiling, and personalized longevity plans, appealing to clients seeking comprehensive, evidence-based healthspan extension. These bundles often include follow-up monitoring and therapeutics, enhancing upsell potential and long-term engagement.

Procedure-Based Fees with Upsells

Some models capitalize on tiered fees for specific interventions (e.g., stem cell therapies, peptide protocols), augmented by add-ons such as biomarker assessments or regenerative consultations. MSO efficiencies in shared operations aim to reduce marketing overhead, targeting affluent demographics for high-margin, repeat utilization.

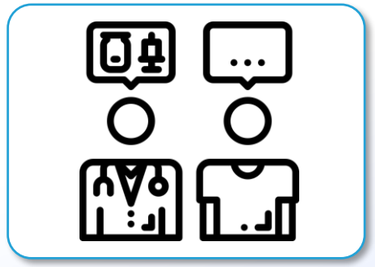
LONGEVITY CLINICS: RESEARCH INSIGHTS

Overview of Longevity Clinic Evolution

Longevity clinics are maturing as a pivotal segment in healthcare, propelled by substantial VC and private equity investments emphasizing preventive and regenerative medicine. Insights from industry leaders underscore a transition from conventional models to aggressive, personalized care addressing aging's root causes, such as cellular senescence and metabolic decline. Despite promising early investments signaling robust growth potential, persistent challenges in scaling operations, integrating insurance, and demonstrating clear ROI hinder broader market adoption.

- **Profitability in Cash-Pay Models:** Insights from investment firms on high-margin concierge structures that attract funding by building patient loyalty and recurring revenue.
  - **Concierge Revenue Drivers:**
    Personalized access with 24/7 support, rapid appointments, and tailored wellness plans drive EBITDA growth.
    Such models ensure steady cash flow through streamlined operations centered on extending healthspan, making them appealing for private equity.
  - **Hybrid Payment Integration:**
    Blending insurance-covered procedures (up to 70%) with elective cash-pay extras, like a $10,000 program split 70/30.
    This approach broadens accessibility while maintaining profitability, though insurers often resist full concierge billing.

- **Distinguishing from Medspas:** Unlike medspas, which emphasize aesthetic procedures with minimal medical oversight.
  - **Physician-Oriented Longevity Clinics:**
    Structured programs including quarterly bloodwork, hormone therapy, and clinical convergence with tools like Oura data or whole-body MRIs.
    This enables pushing preventive health aggressively, with overlap in simple services like GLP-1s but extending to advanced interventions like NAD and mitochondrial health optimization.
  - **Aesthetic Focus in Medspas:**
    Procedures like Botox, red light therapy, and broadband laser for skin rejuvenation, often nurse-led without complex prescribing or medical decisions.
    Medspas offer services on-demand without doctor-guided personalization, lacking the structure for comprehensive health monitoring.



LONGEVITY CLINICS: SECTOR DELINATION AMID MARKET CONVERGENCE

Defining the "Longevity" Sector: A Framework for Differentiation

With "longevity" becoming a buzzword, distinguishing bona fide clinics from contiguous industries requires looking beyond marketing. True differentiation hinges on **medical rigor**, **scientific validation**, and **operational intent**.

- **Exclusion of Aesthetics and Medspas**
  - While these entities often use "anti-aging" marketing, they are distinct from longevity clinics in scope and intent.
  - **Primary Focus:** Superficial interventions for physical appearance (e.g., Botox, fillers, laser resurfacing).
  - **The Gap:** They generally exclude comprehensive evaluation of biological aging markers and proactive chronic disease mitigation.
  - **Key Distinction:** Aesthetics focus on **exterior results**, whereas longevity prioritizes **holistic, systemic physiological resilience**.
- **Exclusion of Wellness Resorts and Spas**
  - These are hospitality-centric environments designed for temporary escape rather than long-term clinical engagement.
  - **Primary Focus:** Immediate rejuvenation and psychological respite through sensory experiences (e.g., mindfulness, detox, massage).
  - **The Gap:** They prioritize transient well-being over sustained health optimization grounded in empirical medical data.
  - **Key Distinction:** Resorts offer an **experiential paradigm**, whereas longevity clinics focus on a **quantitatively anchored methodology**.

Strategic Implications of Industry Delineation

The erosion of categorical boundaries not only obfuscates stakeholder perceptions but also amplifies challenges in investment allocation and regulatory oversight.

- Longevity clinics must contend with stringent medical governance frameworks, including oversight from bodies such as the FDA on investigational therapies, whereas resorts and spas operate within comparatively lenient tourism and hospitality standards.
- This clarity is imperative for discerning high-potential opportunities: authentic longevity clinics afford structured scalability through management services organization (MSO) architectures, predicated on recurrent patient interactions and data-led care pathways, in stark opposition to the transactional, visit-dependent revenue streams characteristic of aesthetics and resort models.

LONGEVITY CLINICS: SELECT PE BACKED LONGEVITY CLINICS AND MSO PLATFORMS

Selected PE-Backed Longevity Clinics & MSOs Platforms (2023–2025)

The following table summarizes private equity (PE)-backed platforms operating as longevity clinics or MSOs. These clinics align with a focus on proactive prevention, biomarker-driven care, hormone therapies, regenerative medicine, and healthspan optimization.

Company		General Summary	Recent Deals	Dollar Amount	Investors	
NOVELLUM LONGEVITY	Novellum Longevity	Denver-based MSO for functional wellness clinics; started with ThriveMD acquisition (HRT, stem cells, PRP); 2 initial CO sites targeting national partnerships for preventive longevity care.	Jul 29, 2025 (Platform creation) Aug 20, 2025 (Senior Debt co-Investment)	Undisclosed	Boyne Capital Platt Park Capital Capitala	●Boyne Capital ●Platt Park Capital ●Capitala Group
Agentis Longevity	Agentis Longevity	Nashville MSO partnering clinics for hormone optimization, stem cells, and vitality testing; 9+ clinics in 7 states post-TRT/weight loss acquisition; aims for 100 sites in 3 years.	August 1, 2024 (Platform creation)	Undisclosed	SHORE Capital Partners	●Shore Capital Partners
HUMAN LONGEVITY	Human Longevity	San Francisco-based precision medicine platform for longevity clinics; launched 100+ Care program with AI diagnostics, whole-genome sequencing, biomarkers, and imaging for disease prevention; 5+ U.S. sites, expanding to Saudi Arabia/Southeast Asia post-$39.8M Series B.	August 21, 2024 (Series B)	$39.8M	BroadOak Capital Partners Panacea Venture TVM Capital	●TVM Capital Healthcare Partners ●Panacea Venture ●Broad Oak Capital Partners

LONGEVITY CLINICS: AN EMERGING FRONTIER OF HEALTHCARE CONSOLIDATION

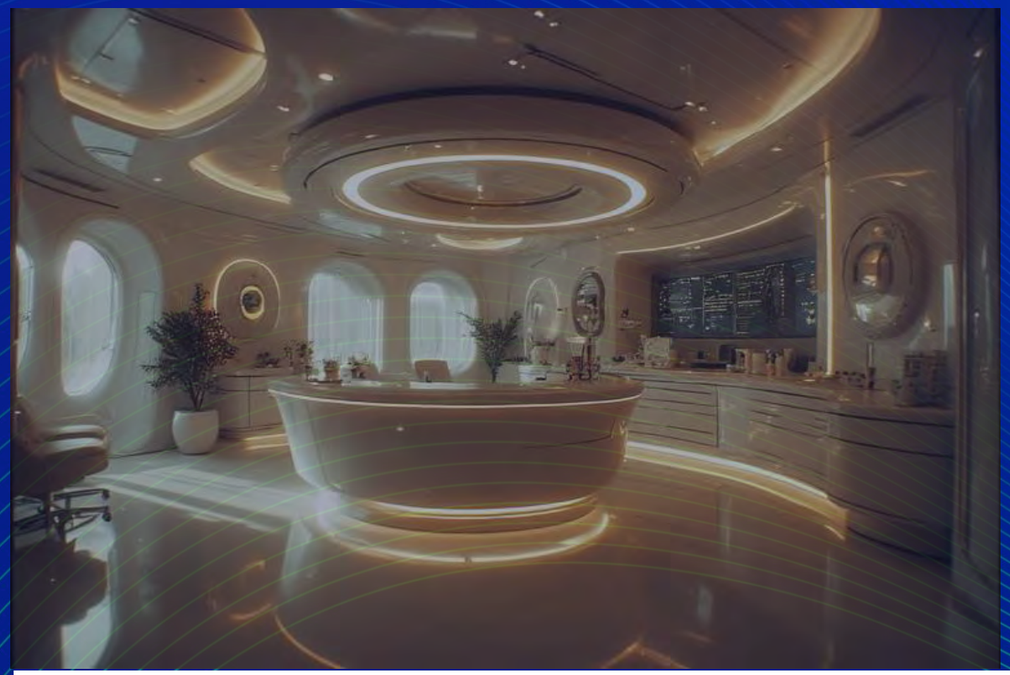
- In 2024 and 2025, private equity firms shifted from traditional medical "roll-ups" to a **"platform play"** approach. Using **Management Services Organizations (MSOs)**, they are consolidating fragmented wellness and anti-aging clinics into unified national brands.

- **Market Drivers and Economic Growth**
  - The sector is fueled by a massive shift toward preventative care and an aging population:
    - **The $6.8 Trillion Wellness Economy:** Currently at record levels, this market is projected to reach **$9.8 trillion by 2029** (7.6% annual growth).
    - **Consumer Demand:** Unlike venture-backed startups (e.g., *Modern Age*), PE firms prioritize high-margin, **cash-pay models** with proven operational resilience.
    - **Demographic Tailwinds:** Consumers over age 50 are driving annual growth rates of up to **20%** in the longevity segment through 2030.

- **Key PE Platforms and Acquisitions (2025)**

  Several major firms have launched aggressive expansion strategies this year:
  - **Novellum Longevity** (Boyne Capital & Platt Park): Launched in July 2025 with a **$20–$50 million** package; acquired *ThriveMD* to scale hormone therapy and regenerative medicine nationwide.
  - **Agentis Longevity** (Shore Capital)**:** Acquired *Mantality* in early 2025, rapidly expanding to over nine clinics across seven states.
  - **Global Hybrid Models:**
    - **Lanserhof** (backed by AltamarCAM)**:** Secured **€95 million** to blend luxury hospitality with clinical longevity.
    - **Human Longevity** (backed by TVM Capital)**:** Focused on global expansion in precision medicine and regenerative care.

- **Current Investment Hotspots**
- Private equity is currently most active in two specific clinical areas:
  - **Biomarker Testing:** Data-driven diagnostics used to track and optimize biological age.
  - **Regenerative Medicine:** Expanding access to stem cell and peptide treatments.



Longevity Clinics:
Emerging Pattern and Investment Opportunity

LONGEVITY CLINICS: EMERGING PATTERN AND INVESTMENT OPPORTUNITY

Maturing Longevity Clinic Market (2025)

Mirrors Genomics & Femtech (~2015): From niche to mainstream growth

3 Critical Components (in no particular order)

01 INFRASTRUCTURE
Establish scalable clinical networks and diagnostic facilities.

02 DATA
Collect biological and healthspan data assets.

03 CLINICAL EXPERTISE
Integrate clinical convergence for evidence-based insights.

• Our focus on longevity clinics is driven by their potential as an investment area within a maturing market, supported by increasing interest in anti-aging and healthspan extension strategies. As illustrated in our Healthcare Longevity Framework**, we believe *longevity clinics represent the intersection of the three core pillars***—data and diagnostics, therapeutics and facilities, and clinical and preventive care—serving as a central component of the longevity ecosystem. This integration encapsulates the broader longevity market, combining data-informed decision-making, therapeutic innovations, and preventive approaches to deliver value and drive sector evolution.

• For investors seeking success in the longevity market, these pillars can be viewed as three critical components: first, building robust **infrastructure** to support scalable delivery; second, harnessing **data** for informed decision-making; and third, leveraging **clinical expertise** for evidence-based interventions. Their convergence is essential to longevity clinics and capturing the market, echoing the expansion of genomics and femtech.

• Utilizing very conservative estimates, we note the genomics sector transitioned from niche applications in 2015—with genome sequencing costs declining by over 50% by 2024—to an industry valued at more than $25 billion in 2023, projected to exceed $80 billion by 2030. Similarly, the femtech market expanded to over $35 billion by 2024. In parallel, the longevity sector is evolving from a peripheral domain to a mainstream opportunity, attracting global investments surpassing $7 billion in 2024, representing an approximate 150% year-over-year growth. This pattern underscores a compelling investment opportunity, indicating that now is an ***opportune time*** **for strategic involvement** in this expanding sector.

We believe the first builders will win in scaling healthier futures.
The question is no longer if longevity becomes mainstream—but who builds the infrastructure first.

LAWRENCE, EVANS & CO., LLC
Investment Banking | Healthcare Finance | Consulting

Lawrence, Evans & Co. LLC “LECO” is a national boutique advisory firm. LECO provides a full range of capital raising (debt & equity), mergers & acquisitions, including buy-side/sell-side, as well as financial and operational restructuring services. Since 2003, we have offered advice and support for every process and structure, from short-term solutions to long-term goals. The firm caters to **Healthcare Providers and Service Companies** (senior housing, hospitals, physician services, home health, hospice, longevity, behavioral health, RCM, HCIT, CCM, RPM, SDOH, Space Health), **Transportation and Logistics** (trucking, warehouse, supply chain), **Business Services** (managed IT and cyber), and **Real Estate**. Typical clients are up to $250M or $15M EBITDA, no minimum.

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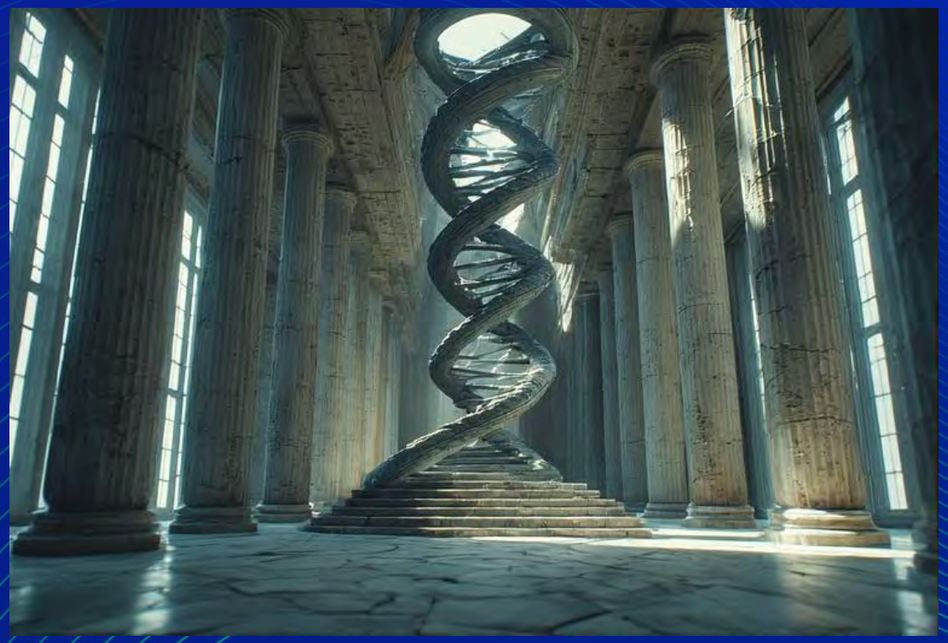
Appendices and References



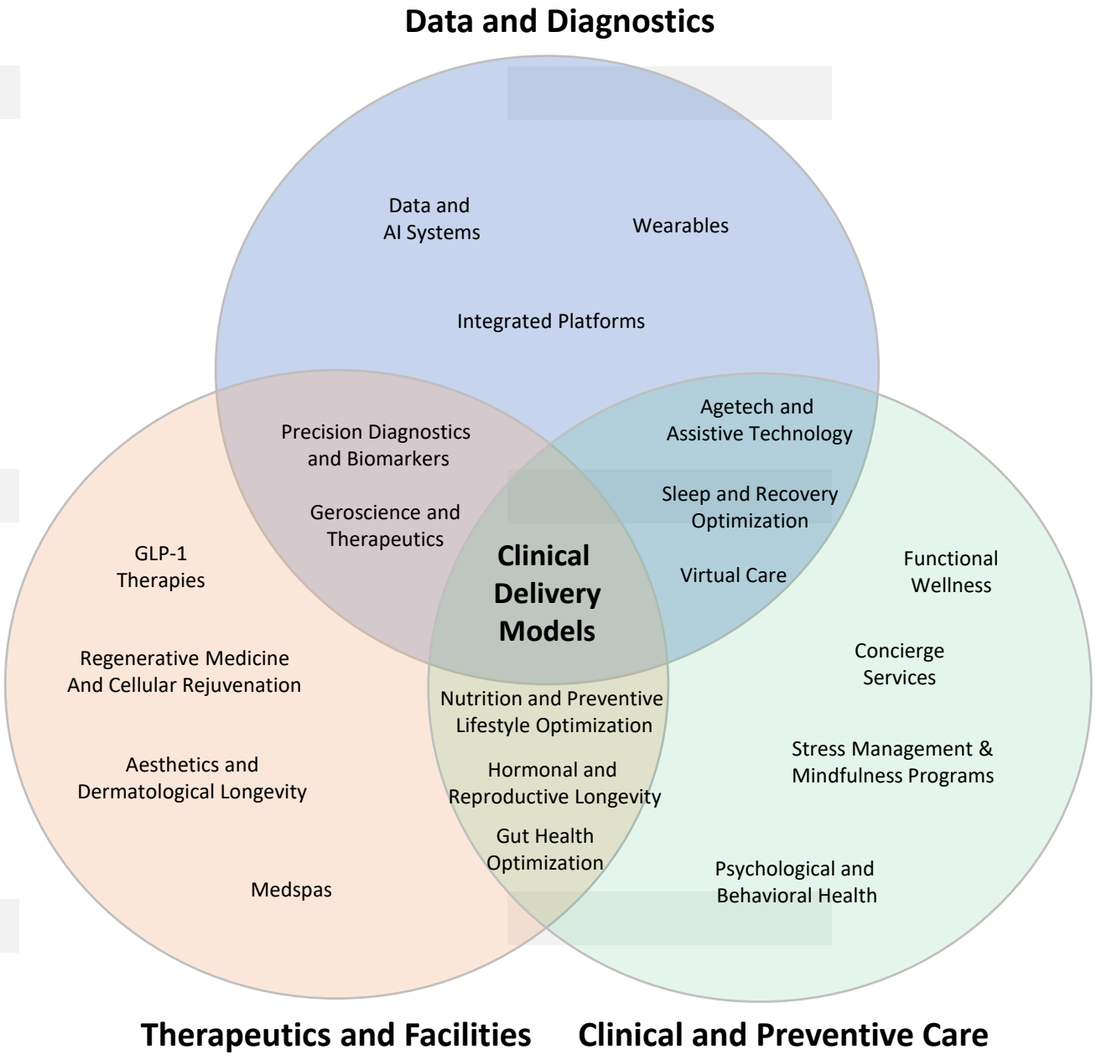
Appendix A -
Interconnected Pillars of Healthcare Longevity

APPENDIX A – INTERCONNECTED PILLARS OF HEALTHCARE LONGEVITY

Interconnected Pillars of Healthcare Longevity

In the landscape of longevity healthcare, the focus is shifting from reactive disease treatment to proactive healthspan extension—maximizing years of vitality through integrated data, therapies, and preventive strategies. By late 2025, advancements such as AI-driven diagnostics, GLP-1 therapeutics, and regenerative medicine are accelerating this paradigm, with clinics worldwide emphasizing personalized interventions against aging's root causes, such as cellular senescence, metabolic decline, and microbiome imbalances.

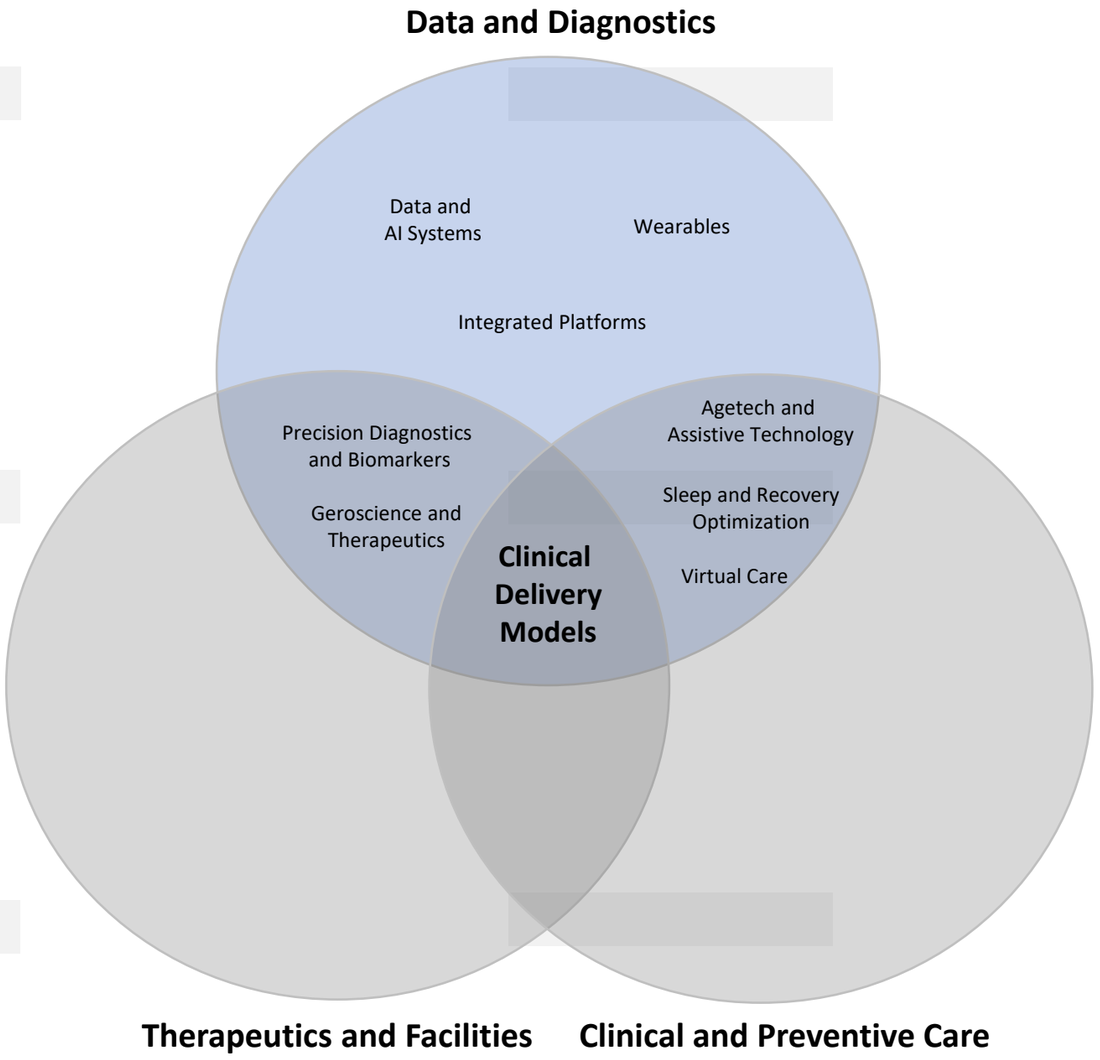
This Venn diagram illustrates three interconnected pillars and associated sectors: Data and Diagnostics for tech insights that include wearables and AI systems, Therapeutics and Facilities for biological/aesthetic interventions that encompass elements such as regenerative medicine, and Clinical and Preventive Care for lifestyle/mental optimization through different delivery methods such as functional wellness or concierge services. These sectors are based on ongoing developments in science such as GLP-1 therapies, and market trends such as rising demand for virtual care or stress management programs.



A – DATA AND DIAGNOSTICS

Data and Diagnostics (Blue Circle)
This pillar harnesses technology for real-time insights into aging processes, using wearables, AI, and platforms to detect biomarkers such as metabolic shifts or inflammation early, enabling personalized longevity strategies amid 2025's AI advancements addressing data biases for inclusive healthspan extension.

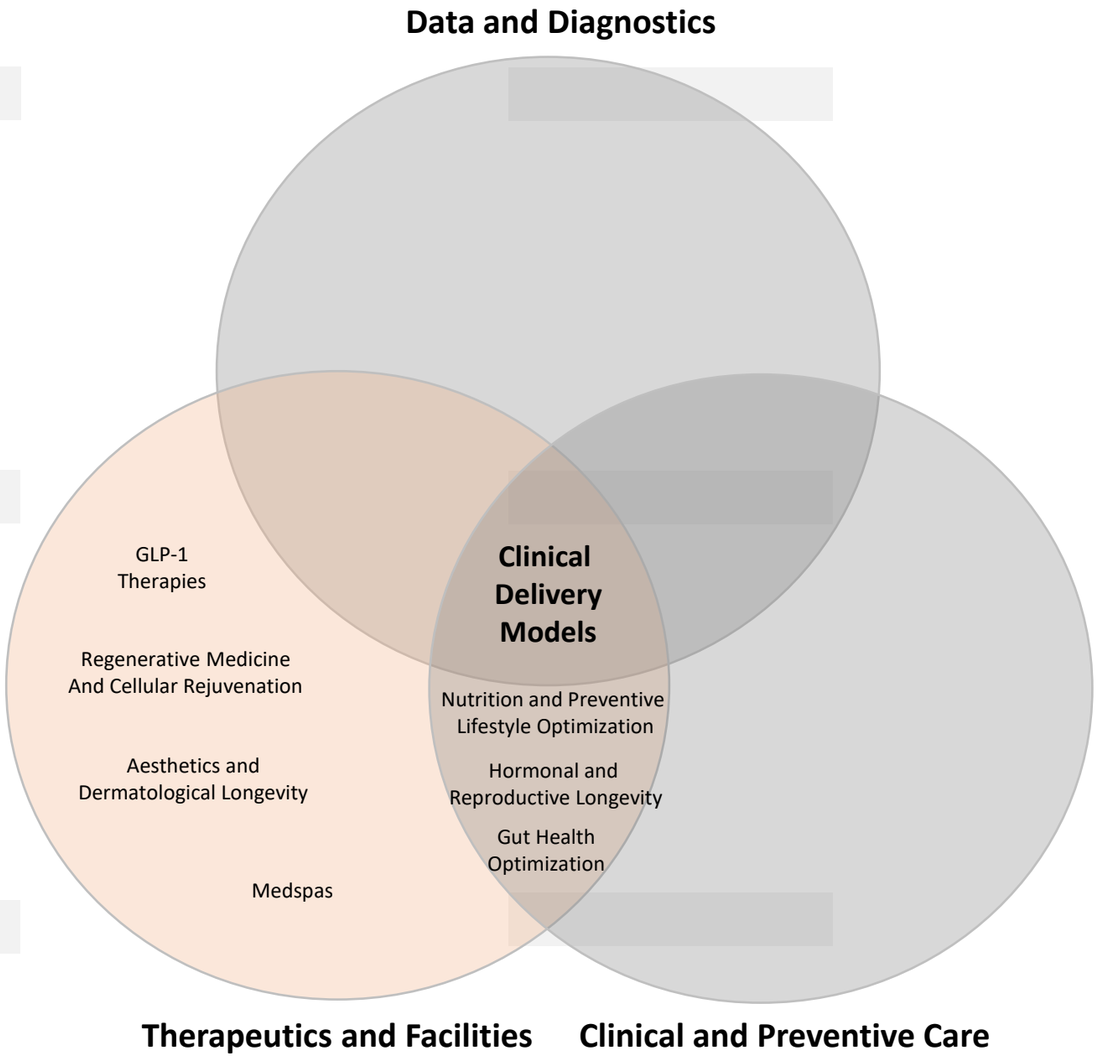
Data and AI Systems: Employs machine learning for predictive modeling of aging trajectories, optimizing interventions to slow cellular senescence and extend healthy years through data-driven personalization.
Wearables: Devices such as smart rings or watches track vital signs and activity, focusing on longevity by monitoring heart rate variability and sleep quality to predict and prevent age-related decline in physical resilience.
Integrated Platforms: Aggregates data from multiple sources into unified dashboards, supporting longevity by providing holistic views of biological age and facilitating timely adjustments to lifestyle factors.
Precision Diagnostics and Biomarkers (overlap with red): Advanced tests measure epigenetic markers or proteins to assess biological aging, guiding targeted therapies to reverse damage and enhance healthspan accuracy.
Geroscience the Therapeutics (overlap with red): Applies data analytics to study aging biology, advancing longevity through discoveries in hallmarks such as genomic instability, with 2025 breakthroughs in multi-omics for precision interventions.
AgeTech and Assistive Technology (overlap with green): AI-powered tools such as fall-detection wearables support independent living, promoting longevity by reducing injury risks and enhancing quality of life for aging populations in a market nearing $2 trillion.
Sleep and Recovery Optimization (overlap with green): Tracks and enhances sleep cycles via apps and sensors, crucial for longevity as optimized rest combats cognitive decline and boosts immune function against age-related diseases.
Virtual Care (overlap with green): Offers remote data-informed consultations, improving longevity access by delivering preventive advice on aging metrics to underserved groups without in-person visits.



A – THERAPEUTICS AND FACILITIES

Therapeutics and Facilities (Red Circle)
This pillar delivers biological interventions in specialized settings, from regenerative therapies to aesthetic enhancements, targeting aging reversal through facility-based innovations such as medspas, fueled by 2025's biotech surge and debates on equitable access in a $85 billion anti-aging market.
Regenerative Medicine And Cellular Rejuvenation: Utilizes stem cells and tissue engineering to repair age-damaged organs, extending healthspan by restoring cellular function and countering degeneration in an evolving field of 2025 regenerative leaps.

GLP-1 Therapies: Employs drugs such as semaglutide for metabolic control, revolutionizing longevity in 2025 by reducing risks from age-related obesity and insulin resistance, potentially extending lifespan through improved cardiovascular health.
Regenerative Medicine And Cellular Rejuvenation: Utilizes stem cells and tissue engineering to repair age-damaged organs, extending healthspan by restoring cellular function and countering degeneration in an evolving field of 2025 regenerative leaps.
Aesthetic and Dermatological Longevity: Focuses on skin and hair restoration via lasers or peptides, addressing longevity by improving dermal health and aesthetics, which support overall vitality and mental well-being.
Medspas: Medical spas offer non-invasive treatments such as IV therapy and microneedling, evolving into longevity hubs in 2025 by combining beauty with regenerative protocols to slow visible aging signs.
Nutrition and Preventive Lifestyle Optimization (overlap with green): Integrates facility-based coaching with therapies to prevent decline, enhancing longevity through habit modifications that delay metabolic and cardiovascular aging.
Hormonal and Reproductive Longevity (overlap with green): Optimizes hormones such as estrogen or testosterone via therapies, preserving vitality and extending healthy reproductive years to combat age-accelerated endocrine disruptions.
Gut Health (overlap with green): Modulates microbiome through probiotics or transplants, boosting longevity by reducing inflammation and improving nutrient absorption, with 2025 research turning gut bacteria into "longevity factories."



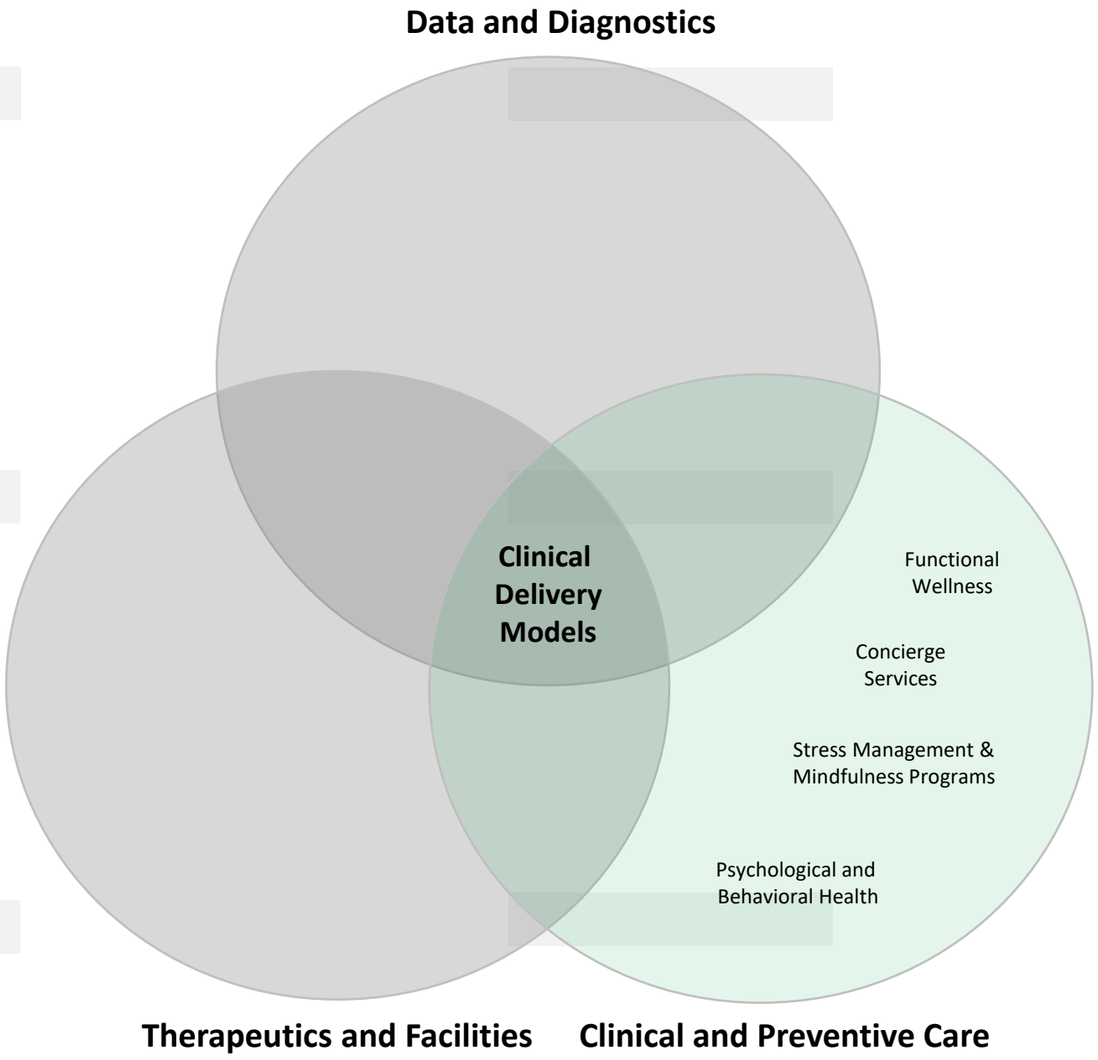
A – CLINICAL AND PREVENTIVE CARE / CENTRAL OVERLAP

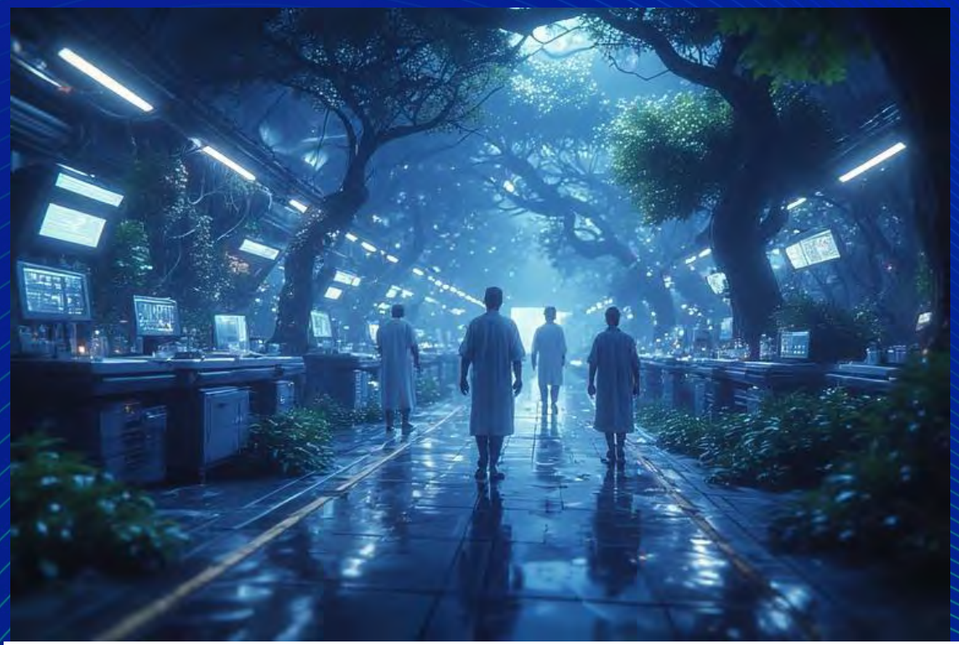
Clinical and Preventive Care (Green Circle)
This pillar provides expert-guided, human-centric strategies for aging prevention, emphasizing lifestyle, mental health, and concierge services to sustain vitality, as 2025 sees rising integration of wellness tech in clinics amid scrutiny over holistic efficacy.

Functional Wellness: Tailored programs for diet and exercise based on individual profiles, optimizing longevity by addressing root causes of decline such as poor metabolism to maximize disease-free years.
Concierge Services: Personalized, on-demand care from physicians, supporting longevity through continuous monitoring and rapid interventions to maintain independence and healthspan.
Stress Management & Mindfulness Programs: Techniques such as meditation reduce chronic stress, essential for longevity as they preserve telomere length and mitigate cognitive aging risks.
Psychological and Behavioral Health: Therapy and coaching target mental resilience, promoting longevity by preventing depression or anxiety that accelerate biological aging processes.

Central Overlap: Clinical Delivery Models
At the intersection of all three pillars, clinical delivery models represent an emerging sector embodying the convergence of tech-enabled diagnostics, regenerative therapeutics, and preventive wellness into holistic healthspan hubs. Here, AI systems and wearables inform treatments like GLP-1 therapies, medspa rejuvenations, and gut health optimizations alongside nutrition coaching, AgeTech aids, and stress management for personalized aging reversal.

These models integrate precision biomarkers with hormonal therapies and virtual care under expert oversight to address metabolic decline and cognitive resilience. This multifaceted approach promises additional healthy years by treating aging as modifiable, yet underscores challenges like high costs, ethical debates on unproven interventions, and the need for validated long-term data amid growing demand. Trends point toward at-home integrations via apps, biotech collaborations for accessible evidence-based care, and hybrid innovations. While the dominant model remains uncertain—it could evolve from hospital care, remote monitoring, smartphone tracking, robotics, or other formats—[longevity clinics] currently lead as the primary emerging option, with flexibility for remote features through integration of cutting edge technology.





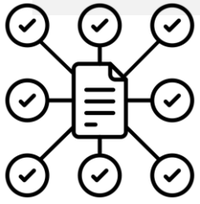
Appendix B -
Evolving Healthcare Longevity Ecosystem

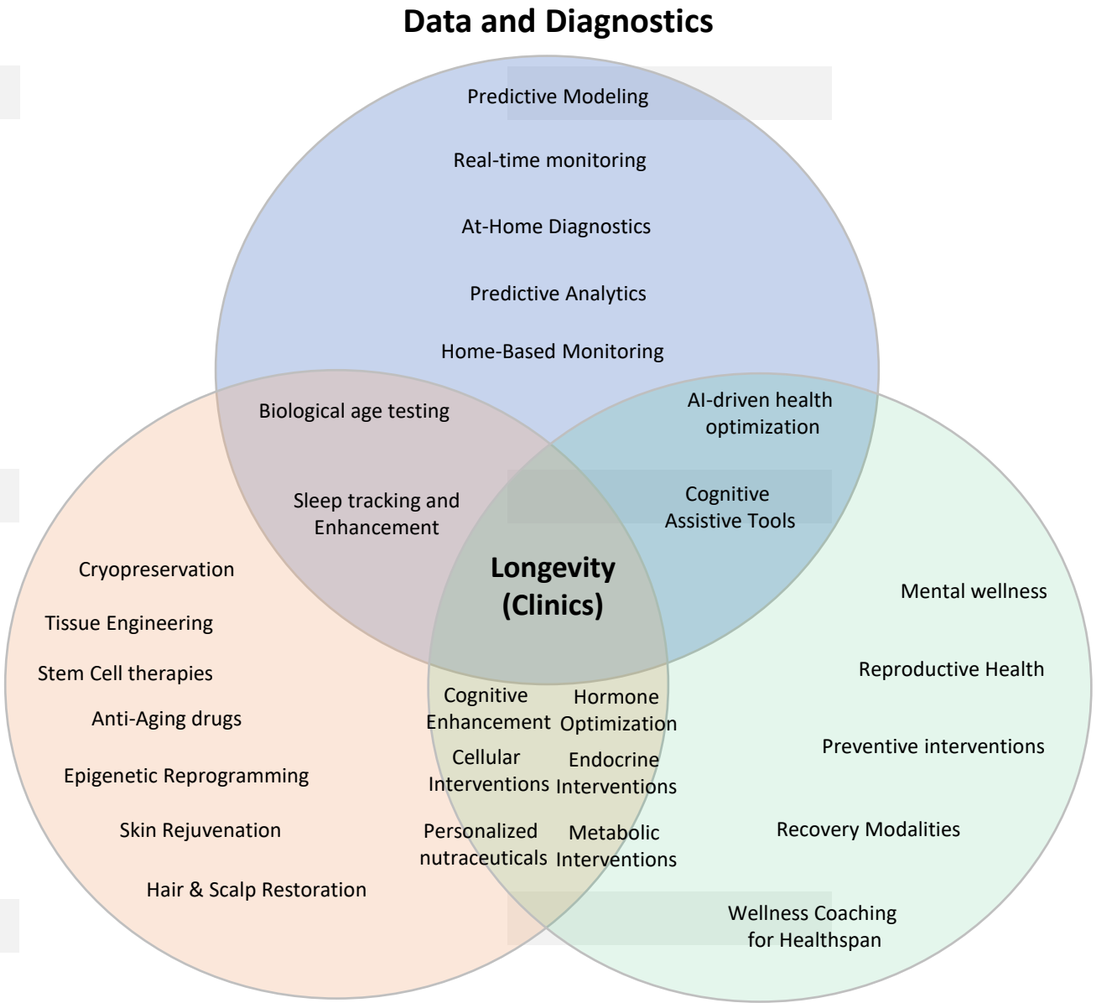
B – EVOLVING HEALTHCARE LONGEVITY ECOSYSTEM

Evolving Healthcare Longevity Ecosystem

In the dynamic and evolving landscape of healthcare longevity, the emphasis is shifting from reactive disease management to proactive healthspan extension, maximizing vibrant years through seamless integration of data, therapies, and preventive measures.

These elements represent refined subsectors of the broader pillars outlined in Appendix A, tailored to capture emerging trends and futuristic innovations in the field such as the inclusion of cryopreservation under Therapeutics and Facilities extends beyond traditional regenerative medicine to explore long-term biological preservation. This granular breakdown is in scientific advancements (e.g., epigenetic reprogramming) and market demands (e.g., at-home tech and wellness modalities), providing a streamlined visualization that anticipates the booming growth of longevity clinics and underscores opportunities for integrated, cutting-edge solutions.

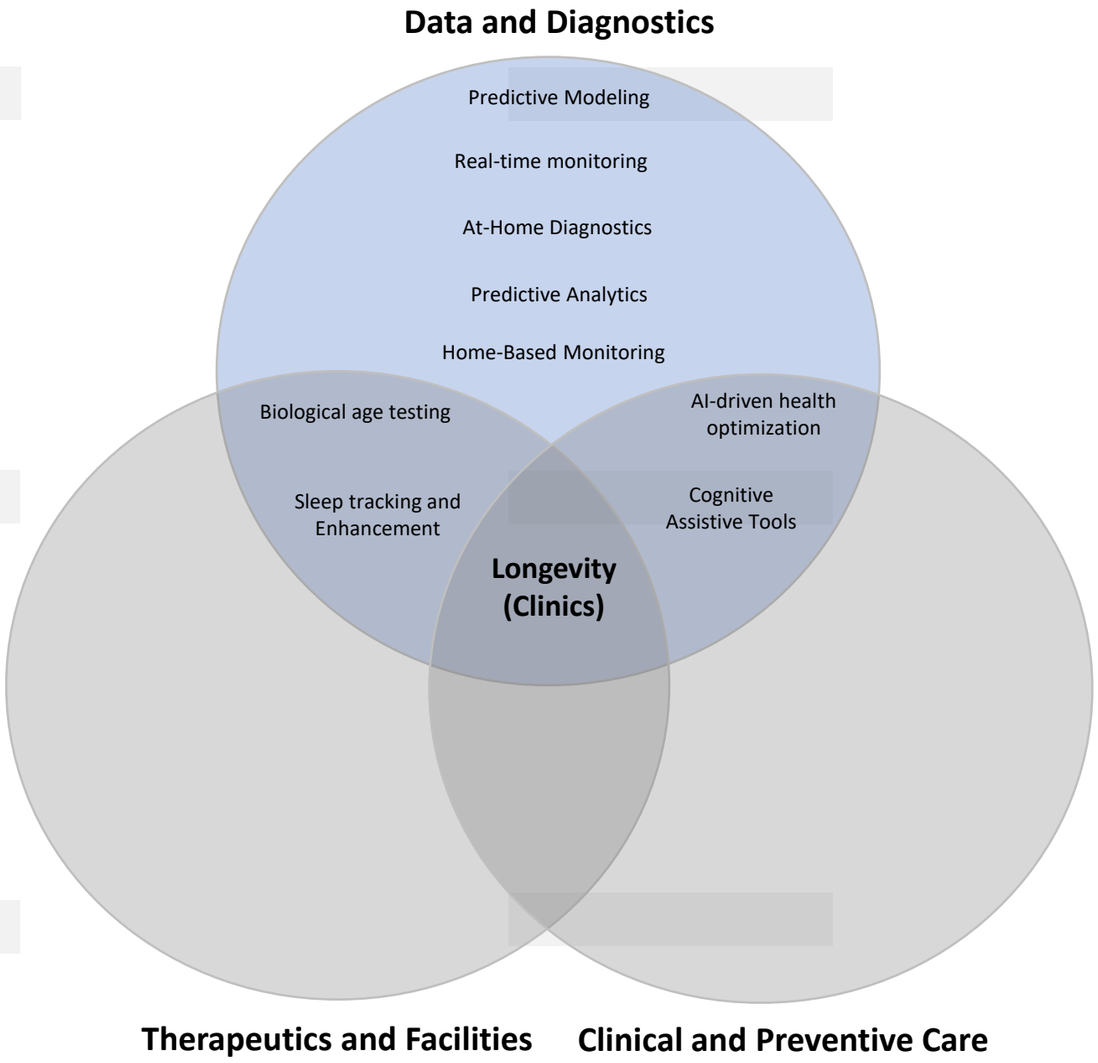




B – DATA AND DIAGNOSTICS

Data and Diagnostics (Blue Circle)
This foundational pillar leverages technology to quantify aging processes, enabling predictive, personalized longevity plans that detect biomarkers such as inflammation or epigenetic changes before symptoms arise—crucial for extending healthspan in an era where AI addresses data gaps for broader demographic applicability.

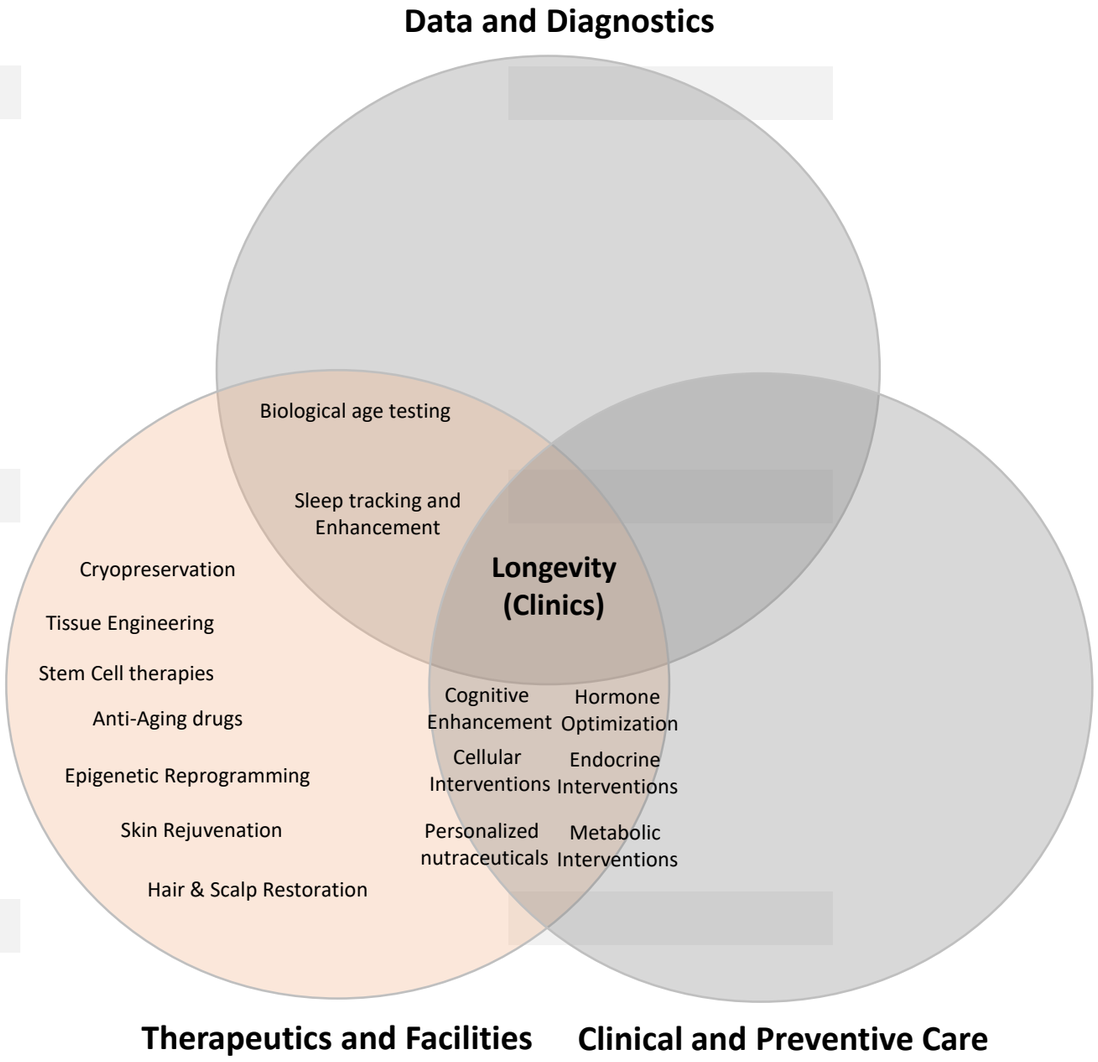
Predictive Modeling: Simulates aging trajectories using genetic and lifestyle data to forecast risks such as cardiovascular decline, guiding early interventions to slow biological aging and add healthy years.
At-Home Diagnostics: Empowers self-testing of longevity markers (e.g., hormone imbalances or NAD+ levels) via kits, facilitating timely adjustments to combat age-related metabolic shifts without clinical visits.
Real-Time Monitoring: Tracks vital signs through wearables to identify subtle aging indicators such as reduced heart rate variability, allowing real-time tweaks to lifestyle for preserved cognitive and physical function.
Predictive Analytics: Applies machine learning to wearable data for trends in fatigue or inflammation, predicting healthspan threats and enabling proactive strategies to mitigate cellular aging.
Home-Based Monitoring: Integrates everyday devices for ongoing sleep and activity tracking, focusing on longevity by optimizing recovery and reducing chronic stress impacts on telomere shortening.
Integrated Platforms: Combines multi-source data into dashboards for holistic aging assessments, supporting customized plans to reverse early epigenetic markers of decline.
Biological Age Testing (overlap with red): Measures epigenetic clocks or telomere length to reveal accelerated aging, informing targeted therapies to reset cellular youthfulness and extend vitality.
Sleep Tracking and Enhancement (overlap with red): Monitors REM cycles to enhance restorative sleep, vital for longevity as it counters cognitive decline and supports immune resilience against age-related diseases.
AI-Driven Health Optimization (overlap with green): Analyzes data for routine recommendations, optimizing energy and metabolism to delay aging hallmarks such as senescence in diverse populations.
Cognitive Assistive Tools (overlap with green): Uses apps with diagnostic integration for brain training, targeting longevity by preventing neurodegenerative risks through enhanced neural plasticity.



B – THERAPEUTICS AND FACILITIES

Therapeutics and Facilities (Red Circle)
This pillar encompasses facility-based interventions to directly counteract aging biology, from regenerative repairs to pharmacological resets, blending research with clinical application to achieve tangible reversals in age-related damage amid 2025's surge in biotech funding and ethical debates on accessibility.

Cryopreservation: Preserves tissues post-mortem for future revival, a speculative longevity approach aiming to bridge current limits in reversing terminal aging processes through advanced revival tech.
Tissue Engineering: Grows scaffolds for regenerating age-worn organs or skin, focusing on longevity by restoring function lost to cellular degradation, as seen in 2025 regenerative leaps.
Stem Cell Therapies: Deploys pluripotent cells to repair joint or neural degeneration, extending healthspan by replenishing depleted stem cell pools that diminish with age.
Anti-Aging Drugs: Targets senescence with compounds such as rapamycin, slowing aging at the cellular level to prevent diseases and add years of vitality, with ongoing trials refining dosages.
Epigenetic Reprogramming: Resets gene expression via factors such as Yamanaka to reverse aging signs, a core longevity strategy for rejuvenating tissues without full cellular overhaul.
Skin Rejuvenation: Employs lasers or peptides to restore elasticity, addressing longevity by combating visible and functional skin aging linked to overall dermal health decline.
Hair & Scalp Restoration: Uses PRP to counter age-induced follicle loss, supporting longevity aesthetics and confidence, which indirectly bolster mental healthspan.
Cognitive Enhancement (overlap with green): Applies nootropics or stimulation under clinical guidance to boost brain function, targeting longevity by mitigating age-related cognitive slowdowns.
Hormone Optimization (overlap with green): Balances declining levels such as testosterone to maintain muscle and energy, a key longevity tactic for preserving metabolic and reproductive vitality.
Endocrine Interventions (overlap with green): Modulates thyroid or insulin pathways to optimize metabolism, preventing age-accelerated disorders such as diabetes for extended healthspan.
Cellular Interventions (overlap with green): Clears senescent cells with senolytics, reducing inflammation to halt aging cascades and promote systemic rejuvenation.
Personalized Nutraceuticals (overlap with green): Tailors supplements to genetic aging profiles, enhancing longevity by addressing nutrient deficiencies that exacerbate decline.
Metabolic Interventions (overlap with green): Mimics fasting or uses GLP-1 agonists to control insulin resistance, a longevity focus for delaying metabolic aging and related comorbidities.



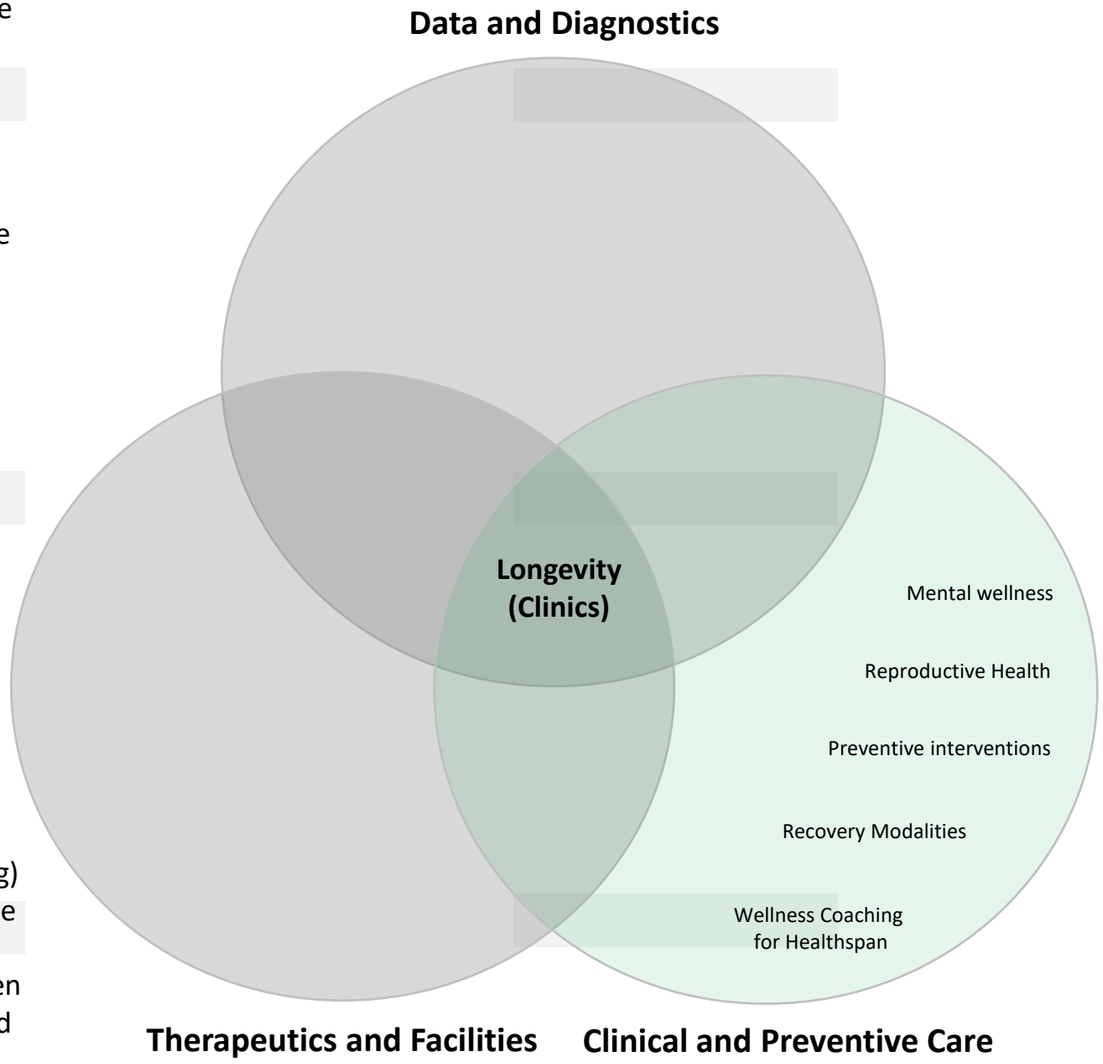
B– CLINICAL AND PREVENTIVE CARE / CENTRAL OVERLAP

Clinical and Preventive Care (Green Circle)
This human-centered pillar translates insights into actionable, expert-guided plans, emphasizing lifestyle and early interventions to prevent aging decline, as longevity clinics rise in 2025 with a mix of promise and scrutiny over unregulated practices.

Mental Wellness: Offers therapy for stress management, essential for longevity as chronic anxiety accelerates telomere shortening and cognitive aging.
Preventive Interventions: Includes genomic screenings to avert age-related diseases, shifting healthcare to preemptive strategies that maximize disease-free years.
Reproductive Health: Manages menopause or fertility decline with non-hormonal options, extending healthy reproductive spans and overall vitality in aging populations.
Recovery Modalities: Utilizes hyperbaric oxygen for post-injury resilience, supporting longevity by enhancing cellular repair mechanisms against cumulative age damage.
Wellness Coaching for Healthspan: Provides tailored diet and exercise guidance based on Blue Zones principles, optimizing habits to extend functional lifespan sustainably.

Central Overlap: Longevity Clinics
At the intersection of all three pillars, longevity clinics represent the pinnacle of integrated healthspan extension, aptly positioned as the **"heart" of Longevity**. Here, data-driven diagnostics inform facility-based therapeutics and expert-led preventive care in a seamless, personalized ecosystem. This convergence unites all elements in a unified framework, best embodying the subsector's potential: **a fully matured clinic *could hypothetically*** offer comprehensive services across diagnostics, therapeutics, and preventive care, maximizing capabilities to address aging holistically.

They could blend AI-powered biomarker tracking (e.g., epigenetic clocks, continuous glucose monitoring) with regenerative treatments like stem cell infusions and senolytics, under clinician oversight for lifestyle optimization and early disease interception. This would tackle aging's multifaceted aspects, from metabolic reprogramming to brain health, but **highlights challenges** like accessibility barriers (costs often >$10,000/year), ethical issues with ***unproven therapies***, and the ***need for long-term outcome data*** amid ***growing demand***. Trends feature app/wearable integration for at-home care, biotech partnerships for custom nutraceuticals, and standards roundtables to reduce risks—potentially **redefining aging as treatable**. With vast growth potential, we are excited to watch and see how things unfold.



Appendix C -
Hallmarks of Aging and Associated Risks

APPENDIX C - HALLMARKS OF AGING AND ASSOCIATED RISKS

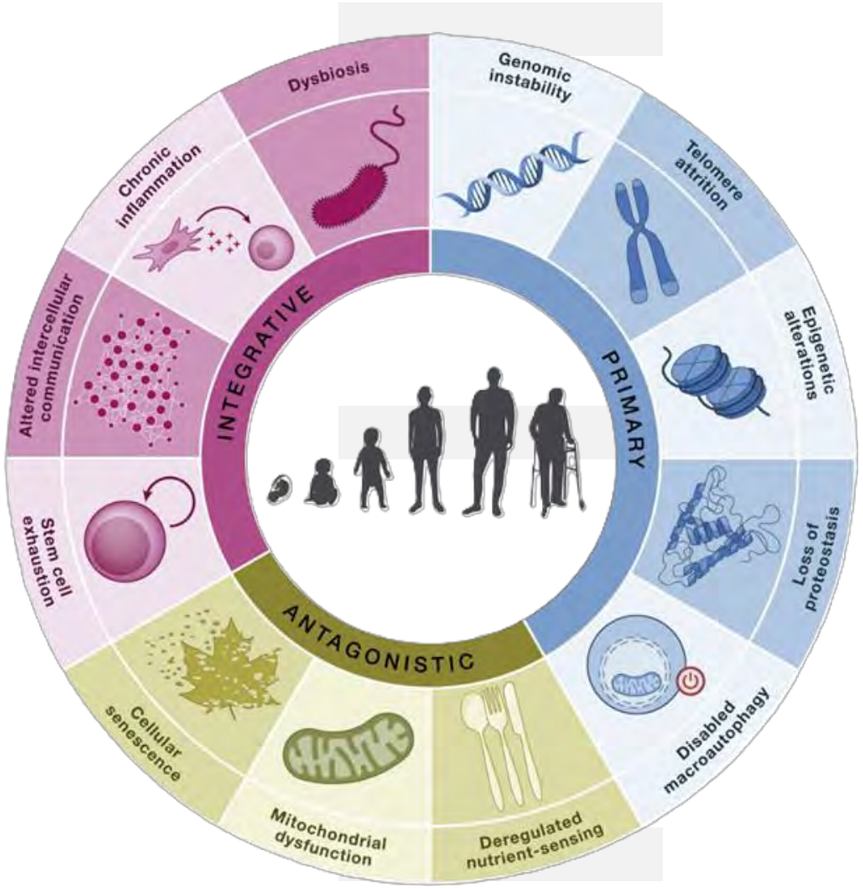
The Role of Aging Hallmarks in Longevity Investments

Longevity is a compelling frontier for investors, balancing risk, opportunity, and innovation amid rising demand for therapies extending healthspan, lifespan, and brainspan. With advancing research and drugs, understanding the underlying science is essential. This educational primer attempts to simplify complex concepts for general audiences, regardless of background in medicine, biology, or longevity.

The science of longevity is increasingly intricate, with interconnected mechanisms and swift discoveries. Yet, tools like artificial intelligence and internet resources help demystify them through analyses, simulations, and updates. Leveraging these aids is key, alongside building foundational knowledge, as they enhance rather than substitute critical insight. This primer offers no claim to completeness but strives to explore an evolving field full of revelations and debates.

Centered on the “Hallmarks of Aging"—a key framework from landmark studies outlining age-related cellular and molecular declines—the content provides for each hallmark: a brief explanation, links to other mechanisms, unsolved health risks, scientific advances, practical applications and market solutions, and reading suggestions. To bridge to investments, it spotlights select companies targeting interventions, noting recent transactions, valuations, and investors, illustrating varied capital flows based on scientific maturity and potential. Markets for each hallmark differ in development, but emerging firms actively invest in exploration and innovation across them.

While curated from current literature, this synthesis is non-exhaustive, recognizing simplification limits and preliminary innovations. It underscores real longevity investment activity, linking science to economic prospects. We hope it aids curious investors in grasping developments and spotting promising opportunities. By merging biology and finance, this tool supports stakeholders evaluating anti-aging technologies, promising returns beyond finance through improved well-being and productivity.



APPENDIX C - HALLMARKS OF AGING AND ASSOCIATED RISKS

Dysbiosis:
Gut microbiome imbalance; fuels inflammation, frailty.
Risks: Autoimmune diseases, metabolic disorders, mental health issues such as depression, colorectal cancer.

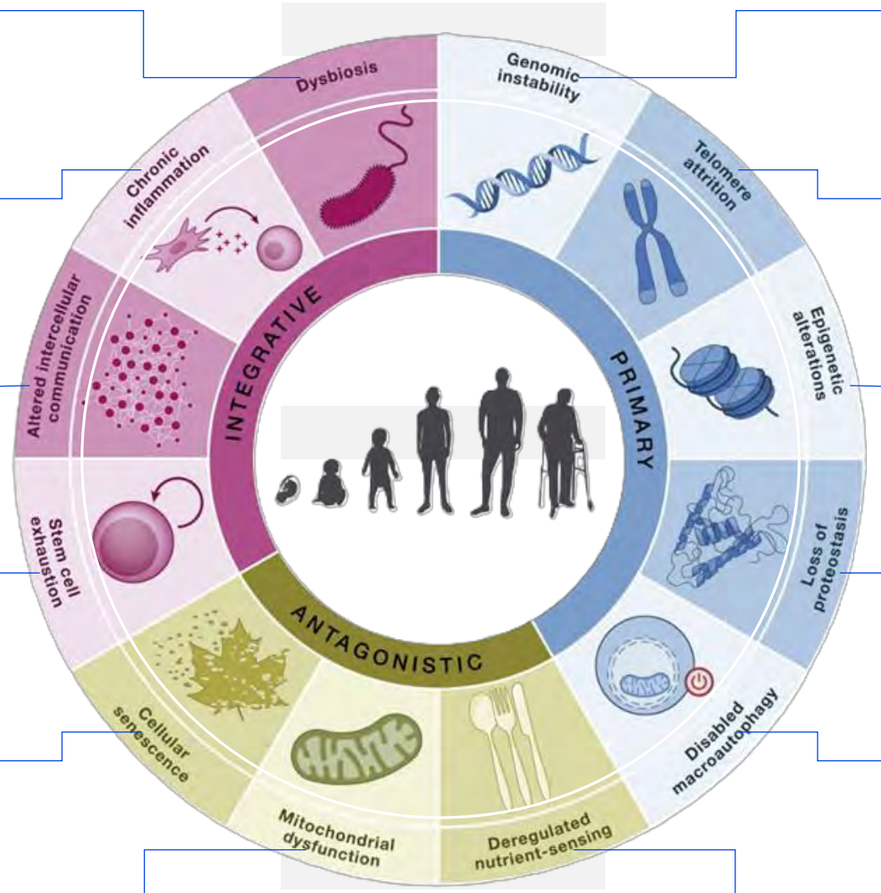
Chronic Inflammation (Inflammaging)
Persistent low-grade activation of inflammation; promotes vascular/organ diseases.
Risks: Heart disease, arthritis, diabetes, Alzheimer's, cancer.

Altered Intercellular Communication
Disrupts signaling; limits healthspan/brainspan.
Risks: Endocrine disorders, immune dysfunction, cancer, metabolic syndromes.

Stem Cell Exhaustion
Limits repair; weakens renewal processes.
Risks: Anemia, immune deficiencies, delayed wound healing, osteoporosis, sarcopenia.

Cellular Senescence
"Zombie" cells secrete SASP; fosters fibrosis, cancer risk.
Risks: Fibrosis, cancer, atherosclerosis, osteoarthritis, chronic kidney disease

Mitochondrial Dysfunction
Energy drop, ROS increase; deepens oxidative stress.
Risks: Cardiovascular diseases, neurodegenerative disorders such as Parkinson's, muscle weakness, diabetes.



Genomic Instability
DNA errors accumulate, causing cancer/mutations; erodes system integrity.
Risks: Cancer, mutations leading to genetic disorders, age-related diseases such as diabetes and cardiovascular conditions.

Telomere Attrition
Shortening limits replication; links to cardiovascular decline.
Risks: Cardiovascular diseases, cancer, immune system weakening, osteoporosis.

Epigenetic Alterations
Gene expression drifts; accelerates frailty.
Risks: Frailty, metabolic disorders, cancer, neurodegenerative diseases such as Alzheimer's.

Loss of Proteostasis
Misfolded proteins disrupt homeostasis; central to Alzheimer’s.
Risks: Alzheimer's, Parkinson's, Huntington's, amyotrophic lateral sclerosis (ALS), cataracts.

Disabled Macroautophagy
Debris impairs proteostasis; exacerbates neurodegeneration.
Risks: Neurodegenerative diseases, metabolic disorders, cancer, liver and kidney dysfunction.

Deregulated Nutrient Sensing
Breakdowns (mTOR, AMPK) cause inefficiencies
Risks: Obesity, type 2 diabetes, cardiovascular disease, cancer.

C - HALLMARKS OF AGING - DYSBIOSIS

Dysbiosis arises as an imbalance in the gut microbiome, where harmful bacteria overpower beneficial ones, throwing off the body's internal harmony. This issue often intensifies with advancing age, driven by elements such as unhealthy eating, overuse of antibiotics, chronic stress, or simply the passage of time. Beyond these roles, the microbiome aids in breaking down food for essential nutrients and energy, educates the immune system to spot dangers versus harmless elements, and links the gut to the brain through networks that influence serotonin for mood regulation. Tackling dysbiosis might alleviate the $4.9 trillion yearly burden of chronic diseases in the U.S., according to CDC figures, through targeted preventive and individualized approaches.

Unchecked dysbiosis fuels escalating loops that deepen existing health challenges. For one, it sparks inflammaging—persistent low-level inflammation—that weakens the gut barrier, enabling leaky gut and toxin entry into the bloodstream. Such dynamics form a vicious circle, aggravating dysbiosis and causing metabolic slowdowns with weight gain, fluctuating blood sugar, and heightened type 2 diabetes likelihood. Meanwhile, immune disruptions may spark autoimmune conditions, and serotonin imbalances can lead to anxiety, depression, or emotional volatility. Sustained inflammation boosts colon cancer risks, while leaky gut accelerates cognitive decay linked to Alzheimer's. Altogether, this reduces lifespan via greater infection risks, frailty, and poor nutrient absorption, while shrinking healthy years through brain fog and mood instability. Cutting-edge research offers ways to counter dysbiosis, such as genetic sequencing to profile the microbiome, tailored probiotics to restore helpful bacteria, fecal microbiota transplants to overhaul the ecosystem, and AI-crafted diets for custom nutrition. Aims here focus on dampening inflammation to foster longevity, optimizing nutrient processing for steady vitality, and steadying gut-brain links for enhanced focus. Available products encompass Pendulum's Akkermansia supplements for blood sugar management and gut fortification, Seres Therapeutics' FDA-cleared VOWST with Firmicutes spores to combat recurring C. difficile, and Viome's AI-supported testing kits.

Biological processes such as the gut-brain axis or inflammaging may provide further context on microbial imbalances driving age-related health declines. Some recommended readings include: "From dysbiosis to longevity: a narrative review into the gut microbiome's impact on aging" (Journal of Biomedical Science, 2025), "The human gut microbiome and aging" (Gut Microbes, 2024), and "Gut microbiota dysbiosis: the hidden roles in human aging and age-related diseases" (Oral Science and Homeostatic Medicine, 2025).

Sector	Subsector	Treatment Type	Longevity Solutions	Valuation	Recent Deals	Investors
Nutrition & Preventive Lifestyle Optimization	Personalized nutraceuticals	Probiotics/prebiotics to rebalance microbiome via supplements	Pendulum Therapeutics has developed targeted probiotic strains for metabolic health, such as Akkermansia for gut barrier repair (San Francisco).	$391M (post valuation)	$101M Series C (Feb 20 2024)	●Sequoia Capital ●True Ventures ●Mayo Clinic
Regenerative Medicine & Cellular Rejuvenation	Stem cell therapies	Fecal microbiota transplants to repopulate healthy bacteria	Seres Therapeutics offers VOWST (formerly SER-109), an FDA-approved microbiome-based therapeutic for preventing recurrent C. difficile infections tied to dysbiosis (Cambridge, MA).	$155.42M / $193.03M (market cap / EV) (Dec 9, 2025)	$250M Debt-General (Apr 27 2023)	●Flagship Pioneering ●Nestlé Health Science ●RA Capital Management
Data & AI Systems	AI-driven health optimization	AI-optimized diets and testing for personalized microbiome interventions	Viome Life Sciences offers or has developed AI analysis of gut microbiome from home tests and nutrition/supplements for dysbiosis correction (Bellevue, WA).	$415.44M (post valuation)	$25.44M Series D (Aug 27 2024)	●Bold Capital Partners ●Khosla Ventures ●Marc Benioff

C - HALLMARKS OF AGING– CHRONIC INFLAMMATION (INFLAMMAGING)

Inflammaging emerges as persistent, subtle inflammation that escalates over the years, resembling an immune response perpetually in high gear. Triggers range from unhealthy food choices to lingering infections or the gathering of broken cell remnants. In contrast to brief inflammation that swiftly neutralizes dangers, this enduring form bombards the body with ongoing alerts, progressively harming vessels, joints, and vital structures. Closely linked to aging dynamics like weakened restoration and persistent tissue pressure, addressing it proves vital for upholding equilibrium and curbing deterioration. Modern breakthroughs confront inflammaging via strategies to eliminate senescent cells using specialized agents, incorporating natural anti-inflammatories from plants like curcumin to halt overzealous signaling (termed cytokine cascades), and utilizing medications such as rapamycin, shown to prolong animal longevity. Objectives encompass curbing inflammation to avert illnesses, maintaining vigor by lessening wear, and shielding neural wellness for sustained acuity. Commercial choices involve lutein supplements for brain aid and turmeric-derived items with curcumin. Rubedo Life Sciences advances new senolytics, amid an anti-aging market surpassing $4.5 billion yearly, expanding swiftly and drawing longevity backers.

Persistent inflammaging generates amplifying circuits that compound ongoing ailments. Notably, it encourages senescent cell buildup—aged cells that cease replication yet emit inflammatory cues, fueling the loop and accelerating tissue erosion. Outcomes include arterial plaque formation, elevating heart attack or stroke threats; joint cartilage degradation restricting motion; blood sugar imbalances heightening diabetes potential; brain protein clusters tied to degenerative disorders; and organ strain like in kidneys, culminating in malfunction. Such impacts abbreviate life via extensive system harm, trim vibrant years with exhaustion and mobility curbs, and erode mental endurance through recall lapses and clouded cognition.

Processes such as cytokine cascades or senescent cell accrual may yield additional insight on chronic inflammation hastening age. Some suggested readings include: "Targeting immunosenescence and inflammaging: advancing longevity research" (Experimental & Molecular Medicine, 2025), "From Senescent Cells to Systemic Inflammation: The Role of Inflammaging in Age-Related Diseases and Kidney Dysfunction" (Cells, 2025), and "Global research trends in inflammaging from 2005 to 2024: a bibliometric analysis" (Front. Aging, 2025).

Sector	Subsector	Treatment Type	Longevity Solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Cellular interventions	Senolytics to clear inflammatory senescent cells	Rubedo Life Sciences is developing senolytics like RLS-1469 for chronic inflammatory diseases (Sunnyvale, CA)	$90M (post valuation)	$40M Series A (July 24 2024)	●Khosla Ventures ●Hevolution Foundation ●Ahren Innovation Capital
Data & AI Systems	AI-driven health optimization	AI-optimized diets and biomarker testing for anti-inflammatory plans	InsideTracker offers AI analysis of biomarkers to recommend inflammation-reducing nutrition (Cambridge, MA)	$65M (post valuation)	$15M Series B (Sep 8 2023)	●BASF Venture Capital ●OurCrowd ●PeakBridge
Nutrition & Preventive Lifestyle Optimization	Personalized nutraceuticals	NAD+ boosters and supplements to mitigate oxidative inflammation	Elysium Health offers Basis (NAD+ precursor) for cellular repair and inflammation control (New York)	$240M (post valuation)	LBO / Buyout (Bending Spoons, ***in discussions***)	●Bending Spoons ●General Catalyst ●Breyer Capital

C - HALLMARKS OF AGING– ALTERED INTERCELLULAR COMMUNICATION

Altered intercellular communication manifests as the erosion of cell-to-cell messaging with advancing years, creating garbled exchanges from influences such as sustained inflammation, hormonal fluctuations, and toxic releases from senescent cells—aged cells that halt replication but persist, dispersing SASP (senescence-associated secretory phenotype) signals that upset adjacent areas. Essential networks falter, including mTOR for overseeing growth, division, and protein creation based on nutrients, or AMPK for sensing low energy to ramp up ATP and trim waste, both diminishing in efficacy. Emerging research counters this with precise treatments to realign pathways, CRISPR for exact genetic fixes on errant signals, and agents blocking SASP to curb its spread. Goals center on refining cellular dialogues for delayed degradation and lasting power, bolstering unified mends for improved routine stamina, and fortifying neural ties for steadier cognition. Prominent progress features bespoke CRISPR for cell fixes, methods transferring robust mitochondria—cellular powerhouses—to revitalize systems, and AMPK stimulators such as metformin, typically for diabetes control.

Lingering altered communication spawns strengthening loops worsening persistent ailments. Harmful SASP from senescent cells ignites continuous inflammation, prompting additional senescence in a reinforcing spiral that deepens disarray and injures tissues. Consequences involve brain signaling glitches hastening recall woes and cognitive lag; unchecked proliferation boosting cancer hazards; hormone disruptions yielding ongoing fatigue; or broad debility exposing the body to sickness. Results frequently mean diminished mobility or stamina, alongside curtailed sharp-minded periods from mood swings or hazy reasoning.

Further investigation into topics such as SASP dynamics or sensing routes such as mTOR and AMPK could furnish additional background on communication failures propelling age declines. Some notable readings include: "Targeting the hallmarks of aging: mechanisms and therapeutic opportunities" (Front. Cardiovasc. Med., 2025), "Aging and aging-related diseases: from molecular mechanisms to interventions and treatments" (Signal Transduction and Targeted Therapy, 2022), and "Aging Hallmarks and Progression and Age-Related Diseases: A Landscape View of Research Advancement" (ACS Chemical Neuroscience, 2024).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Epigenetic Reprogramming	Partial reprogramming to restore cell signaling and resilience.	Retro Biosciences is developing partial reprogramming technologies to restore cell signaling and resilience (Redwood City, CA)	N/A, $1.18B raised to date.	$1.0B Series A (May 21, 2025)	●Prosto Venture Club ●Sam Altman
Geroscience & Therapeutics	Epigenetic Reprogramming	Small molecule activators for AMPK/mTOR to regulate cellular communication.	Repair Biotechnologies is developing therapies to reverse thymic atrophy, restoring immune cell signaling and intercellular communication in the aging immune system (Syracuse, NY)	$74.42M (post valuation)	$11.42M Seed Round (Nov 25, 2025)	●100 Plus Capital ●Bioverge Ventures ●Healthspan Capital
Geroscience & Therapeutics	Epigenetic Reprogramming	AI-driven epigenetic reprogramming using machine learning to develop therapies that restore cellular communication.	Junevity is developing AI-guided partial reprogramming to reset cellular identity and rejuvenate intercellular signaling networks disrupted by aging (San Francisco, CA)	N/A $10M raised to date.	$10M Seed Round (May 22, 2025)	●Godfrey Capital ●Goldcrest Capital ●Venture Science

C - HALLMARKS OF AGING– STEM CELL EXHAUSTION

Stem cell exhaustion denotes the waning potency of bodily stem cells—adaptable units capable of self-duplication and differentiation into tissues such as skin, blood, or muscle—with progressing age. Origins trace to lifelong divisions, inflammation from hyperactive immunity, or DNA error accrual, depleting functional stem cells for routine maintenance. Integral to aging, it overlaps with senescence—lasting division cessation—hindering tissue revival, underscoring the need to intervene for preserving repair prowess and adaptability. Contemporary efforts mitigate stem cell exhaustion via allogeneic transplants employing non-matching donor cells for prompt availability, potentially requiring anti-rejection meds. Alternative tactics awaken dormant cells to resume mending. Tactics advance regeneration for prolonged existence, reinforce frameworks for dynamic periods, and bolster neural support for enduring clarity. Clinical offerings involve mesenchymal stem cells from marrow or fat—these flexible units convert to bone, cartilage, or muscle while emitting anti-inflammatory aids for repair, frailty relief, and quicker recovery.

Unabated stem cell exhaustion initiates intensifying loops magnifying ongoing troubles. Reduced activity hampers tissue mending, overloading survivors and accelerating their depletion, undermining systems. Effects encompass anemia from scarce red blood cells inducing tiredness; vulnerable immunity to pathogens; slow injury healing; osteoporosis with fragile bones prone to breaks; and sarcopenia elevating fall dangers. Outcomes abbreviate life through organ collapse, shrink active phases with mobility constraints and vigor loss, and lessen mental span as neural renewal lags, yielding forgetfulness.

Additional reading on themes such as senescence or DNA accumulation might elucidate stem cell waning's effects on aging. Recommended readings include: "A stem cell aging framework, from mechanisms to interventions" (Cell Reports, 2022), "Running on empty: Exploring stem cell exhaustion in geriatric musculoskeletal disease" (Maturitas, 2024), and "Stem cell exhaustion and its role in healthy aging" (Open Access Government, 2025).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors	
Regenerative Medicine & Cellular Rejuvenation	Stem cell therapies	Allogeneic cell therapies using lymph nodes as bioreactors for organ regeneration.	Lygenesis offers allogeneic cell therapies to regenerate organs in lymph nodes, countering stem cell exhaustion in end-stage organ diseases for enhanced longevity (Pittsburgh, PA).	$100.30M (post valuation, ***Dec 30, 2020***)	$19M Series A2 (Oct 23 2023)	JUVENESCENCE Prime Movers Lab	●Juvenescence ●Prime Movers Lab
Regenerative Medicine & Cellular Rejuvenation	Stem cell therapies	Placenta-derived allogeneic cells for immune modulation and tissue regeneration.	Celularity offers placenta-derived mesenchymal stem cell products to rejuvenate exhausted stem cells and promote repair (Florham Park, NJ).	$53.54M / $120.18M (market cap / EV) (Dec 9, 2025)	2PO (cancelled) (Mar 10 2025) $6M PIPE (Jan 16 2024)		●Dragasac Limited
Regenerative Medicine & Cellular Rejuvenation	Stem cell therapies	Stem cell-derived therapies for ophthalmic and neurological regeneration.	Lineage Cell Therapeutics offers allogeneic stem cell transplants to counteract stem cell depletion in age-related conditions (Carlsbad, CA).	$389.25M / $350.14M (market cap / EV) (Dec 9, 2025)	$30M PIPE (Jan 27 2025)	Broadwood Capital	●Broadwood Capital

C - HALLMARKS OF AGING– CELLULAR SENESCENCE

Cellular senescence unfolds when cells irrevocably cease division, originally a defense against cancerous transformation of injured cells, yet these persistent "zombie" units amass and emit SASP (senescence-associated secretory phenotype)—harmful blends of signals, growth elements, and enzymes disturbing nearby healthy zones. Triggers encompass cell strain, DNA injury from UV or pollutants, or telomere erosion—chromosome end guards dwindling per division, capping at roughly 50 splits (Hayflick limit). Pivotal in aging, it transitions from protective to harmful, meshing with inflammation and tissue decay, rendering zombie cell removal critical to break the decline. Progressive science tackles senescence using senolytics—agents selectively purging zombies—and epigenetic shifts reprogramming them to standard, alleviating SASP. Efforts postpone onset for added years, boost routine ease by soothing discomforts, and defend neural wellness from inflammatory threats. Standout progress includes rapamycin as mTOR suppressor limiting immune senescence via protein oversight, and psilocybin from fungi prolonging lab cell life via telomere care and stress cut—early work stirring debate over controlled status awaiting oversight. Accessible choices include fisetin supplements from berries as senolytics, or iNKT boosters mobilizing immune types to spot and erase damaged cells, merging swift innate with precise adaptive.

Ongoing senescence breeds enduring loops heightening persistent troubles. SASP disperses inflammation, inducing additional senescence and escalating issues with tissue fibrosis. Impacts feature fibrosis impairing organs with scar excess; atherosclerosis spiking attack/stroke via artery plaques; osteoarthritis with joint erosion and pain; kidney ailments from filtering drop; and Alzheimer's through memory-eroding brain plaques. Such persist to curtail life via cumulative harm, constrain vibrant spans with movement barriers, and lessen mental endurance via nerve swelling, fostering fog and disarray.

Further reading on concepts such as SASP or telomere wear might highlight senescence's part in age shifts. For additional information, consider the following readings: "Cellular senescence: mechanisms and relevance to cancer and aging" (J Biochem, 2025), "The interplay of cellular senescence and reprogramming: a critical balance in cellular fate" (Front Cell Dev Biol, 2025), and "Senescence in cancer" (Cancer Cell, 2025).

Sector	Subsector	Treatment Type	Longevity solutions		Valuation	Recent Deals	Investors	
Geroscience & Therapeutics	Anti-aging drugs	Epigenetic therapeutics to reduce cellular senescence.	turn.bio	Turn Biotechnologies offers mRNA-based ERA technology to combat epigenetic aging and reduce senescence in skin and other tissues (Mountain View, CA).	$59.0M (post valuation)	$29.13M Series A (May 10, 2024)	kv, astellas	●Khosla Ventures ●Astellas Venture Management ●Formic Ventures
Geroscience & Therapeutics	Cellular interventions	Plasmid-based gene therapies to induce apoptosis in senescent cells.	OISÍN BIOTECHNOLOGIES	Oisin Biotechnologies offers genetic medicines to eliminate senescent "zombie" cells (Seattle, WA).	$61.38M (post valuation)	$25.43M Series A (Jun 28, 2024)	abbvie, LONGGAME, Methuselah Foundation	●AbbVie Ventures ●Methuselah Foundation ●LongGame
Geroscience & Therapeutics	Cellular interventions	Small molecule iNKT agonists to activate immune clearance of senescent cells.		Deciduous Therapeutics offers immunotherapies to activate iNKT cells for clearing senescent cells (San Francisco, CA).	$45M (post valuation, ***May 8, 2023***) $26.50M raised to date.	N/A Later stage VC (Mar 1, 2023)	EOS BioInnovation, LONGGAME, Gaingels	●EOS BioInnovations ●LongGame ●Gaingels (***past***)

C - HALLMARKS OF AGING– MITOCHONDRIAL DYSFUNCTION

Mitochondrial dysfunction surfaces when mitochondria—cellular power units transforming food and oxygen into ATP for activities such as muscle work or brain tasks—yield less energy and more ROS, volatile particles injuring proteins and DNA. Roots lie in oxidative buildup, mitochondrial DNA mutations (vulnerable near ROS zones), or fusion/fission imbalances (merging for healthy shares, splitting for faulty isolation). Central to aging, it intertwines with inflammation and senescence, amplifying energy gaps and tension, necessitating fixes for cell vigor and contained effects. Fresh strategies combat it via NAD+ amplifiers for ATP uplift or donor transfers to restock, cutting ROS. Numerous leverage autophagy—damaged part recycling—with mitophagy pinpointing flawed mitochondria for quality. Approaches defer ailments for extra years, uplift activities without exhaustion, and sustain acuity versus oxidative blur.

Enduring mitochondrial dysfunction forges aggravating circuits: surplus ROS injures mitochondria more, slashing ATP and elevating ROS, heightening damage. This spawns cardiomyopathy (heart enfeeblement from power lacks); Parkinson's (ROS brain protein clusters); sarcopenia (motion-limiting muscle erosion); diabetes (flawed insulin/glucose management); and lasting tiredness. Consequences abbreviate life through system breakdowns, restrict vibrant phases with energy dips and bounds, and hinder cognition as neurons underperform, yielding sluggishness. Notable developments include nanoflowers spurring stem cell mitochondrial growth for possible double capacity; Jupiter Neurosciences' resveratrol with superior absorption triggering SIRT1 defense; Mitolyn Labs' Mitolyn antioxidant mix; and DSM-Firmenich's 2025 resVida resveratrol plus ALL-Q CoQ10 for vitality, alongside diabetes transfer studies.

Domains such as ROS buildup or autophagy routes may add understanding of mitochondrial parts in age decay. These reviews could assist for expanded knowledge: "Mitochondria dysfunction: cause or consequence of physiologic aging?" (Genes & Development, 2025), "Mitochondrial dysfunction in the regulation of aging and aging-related diseases" (Cell Communication and Signaling, 2025), and "Mitochondrial Dysfunction in Aging, HIV, and Long COVID: Mechanisms and Therapeutic Opportunities" (Pathogens, 2025).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Anti-aging drugs	Small molecule modulators of mitochondrial RNA and genome stability.	Pretzel Therapeutics is developing therapies to modulate mitochondrial biology and reverse dysfunction in degenerative diseases. (Waltham, MA).	$91.5M (post valuation)	$72.5M Series A (Sep 2022)	●ARCH Venture Partners ●GV ●The Invus Group
Geroscience & Therapeutics	Anti-aging drugs	Therapies to repair mitochondrial function and address age-related decline.	Life Biosciences is developing treatments targeting mitochondrial repair for age-related diseases (Boston, MA).	$500M; (post valuation, ***Jan 15, 2019***) $175.19M raised to date.	N/A, (May 1, 2025)	●Abundance Partners ●Hybridge Capital Management ●FreeMind Investments
Geroscience & Therapeutics	Anti-aging drugs	Small molecule enhancers of mitophagy to treat age-related mitochondrial decline.	Vincere Biosciences is developing inhibitors to enhance mitophagy for Parkinson's and other age-related diseases (Boston, MA).	$40M; (post valuation)	$5M Series A (Apr 1, 2025)	●Draper Associates ●Portal Innovations ●Quadrascope Ventures

C - HALLMARKS OF AGING– GENOMIC INSTABILITY

Genomic instability denotes rising alterations in the genome—the complete DNA guide for organism construction and operation—with age. Shifts encompass mutations altering sequences and possibly key genes; chromosomal reshuffles causing gains or deletions; and telomere shortening sparking cell chaos or halt. Sources include external harms such as sun or toxins, division copy slips (one per billion units roughly), and fading repairs—such as break fixes dropping 20-50% efficiency in aged cells from lesser enzymes. Innovative science battles genomic instability using CRISPR—a bacteria-sourced editor with guide RNA pinpointing sites and Cas9 slicing for mends—or gene therapies with viral carriers inserting corrections. Tactics reestablish balance, defer ailments for extended living, fortify resilience versus decay, and uphold cognition amid genetic woes. Notably, CAR-T modifies T-cells, often CRISPR-assisted, to fight cancer via tumor tumor alterations.

Core to aging, it aligns with lasting inflammation, cell malfunctions, and disease spikes, highlighting interventions for genetic firmness and wellness. Unmanaged genomic instability ignites perpetual loops elevating risks. DNA error piles can spark wild growth, surging cancer multiples; brain accretions forming toxic clumps, aggravating Alzheimer's; immune response narrowing, amplifying infection odds twofold or more later on; and tissue abrasion breeding frailty. Impacts contract life through lasting woes, bound healthy spans with amplified fragility and curbs, and trim mental endurance via nerve disruptions and recall breaks. Recent developments include upgraded CRISPR with superior mutation fixes for sickle cell in trials; AAV gene deliveries supplying tools such as DNA ligase for seals; and base editing for accurate single-base changes sans big cuts, displaying solid lab precision for inherited issues.

Areas such as telomere reduction or repair paths may elucidate instability's aging role. Some suggesting readings for broadening understanding include: "Aging Alters Genomic Instability at Endogenous Mutation Hotspots in Mice" (Scientific Reports, 2025), "Effects of Aging on Z-DNA-Induced Genetic Instability In Vivo" (Genes, 2025), and "Genomic Instability and Genetic Heterogeneity in Aging: Insights from Clonal Hematopoiesis (CHIP), Monoclonal Gammopathy (MGUS), and Monoclonal B-Cell Lymphocytosis (MBL)" (GeroScience, 2024).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Cellular interventions	Gene therapies to correct genetic defects in neurological diseases.	Voyager Therapeutics offers gene therapies to modify disease-causing genes, addressing genomic instability in aging-related neurological conditions (Lexington, MA).	$240.19M / $240.19M (market cap / EV) (Dec 9, 2025)	$70M 2PO (Jan 8, 2024)	●Armistice Capital ●BlackRock
Geroscience & Therapeutics	Anti-aging drugs	CRISPR genome-edited cell therapies to correct genetic errors.	Caribou Biosciences offers CRISPR-edited allogeneic CAR-T therapies to target cancer cells, addressing genomic instability in oncology (Berkeley, CA).	$176.65M / $54.86M (market cap / EV) (Dec 9, 2025)	$125M 2PO (Jul 14, 2023)	●Pfizer Venture Investments ●Vanguard Group ●Millennium Management
Geroscience & Therapeutics	Cellular interventions	Gene therapies for ocular diseases to repair genetic defects.	Ocugen offers gene therapies to treat age-related ocular conditions by correcting genomic defects (Malvern, PA).	$374.78M / $375.18M (market cap / EV) (Dec 9, 2025)	$20M PIPE (Aug 12, 2025)	●Janus Henderson Investors

C - HALLMARKS OF AGING– EPIGENETIC ALTERATIONS

Epigenetic alterations consist of shifts regulating gene activity—switching genes active or dormant—sans DNA sequence changes. Core processes feature DNA methylation adding methyls to bases, frequently muting genes; histone tweaks tagging DNA-wrapping proteins to loosen/tighten for access control; and chromatin restructuring to facilitate/block DNA-to-RNA transcription for proteins. Age brings uneven accrual from diet/toxin stressors disrupting regulators, division-passed flaws, and fading maintenance—such as HDAC enzyme shifts in elder tissues. Cells forfeit specialized functions, yielding errant gene work and tissue weakness. Bound to senescence and stem exhaustion, it upends control and flexibility, rendering adjustments key for accurate operation and enduring wellness. Latest research research tackles epigenetic alterations through focused instruments such as brief Yamanaka factors—drawn from OSKM genes—that realign patterns without immature reversion. Alternatives employ molecules tweaking methylation/acetylation, such as HDAC blockers easing histone for gene reach, and exact editors for pinpoint adjustments. Tactics defer illnesses for extended existence, uphold routine energy sans drop, and safeguard cognition amid shifts.

Neglected epigenetic shifts spawn amplifying circuits magnifying risks. Faulty methylation might awaken cancer genes while quieting guards, hastening tumors via drift; brain hyper-methylation on tau fosters Alzheimer's plaques; insulin gene silencing derails metabolism, spiking diabetes; histone alterations shrink immune diversity, upping infections; and repair gene faults breed frailty. Results condense life through disease heaps, bound healthy phases with lesser suppleness and power, and curb mental span via chaotic neural genes, inducing haze and confusion. Recent advancements include mouse cell "revivals" undoing age signs for 30% life boosts; Horvath clock assessing bio-age via DNA marks accurately; AI parsing patterns for aging forecasts; and secure edits resolving issues potently in trials sans DNA injury.

Additional reading and understand of methylation motifs or histone acetylation may offer added insight on changes propelling aging. Some recommended readings for further research and understanding include: "Epigenetic Regulation of Aging and its Rejuvenation" (PMC, 2025), "Epigenetic reprogramming as a key to reverse ageing and increase longevity" (Ageing Research Reviews, 2024), and "Epigenetic Alterations in Aging: A Brief Review" (Journal of Urban Health Research, 2024).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Epigenetic Reprogramming	Epigenetic engineering to reprogram cellular states.	Moonwalk Biosciences offers platforms for mapping and targeting the epigenome to develop precision medicines for age-related diseases (San Francisco, CA).	$150M (post valuation)	$57M Series A (Jan 4, 2024)	●ARCH Venture Partners ●GV ●Khosla Ventures
Precision Diagnostics & Biomarkers	Biological age testing	Epigenetic testing to measure biological age and system fitness.	Generation Lab offers cheek-swab tests using DNA methylation to assess aging speed and disease risk for personalized longevity plans (Berkeley, CA).	$N/A *$11M raised to date.*	$11M Seed (Oct 23, 2025)	●Accel ●Samsung Next ●Aoki Labs
Geroscience & Therapeutics	Epigenetic Reprogramming	CRISPR-based epigenetic editing to modulate gene expression.	Epicrispr Biotechnologies develops the GEMS platform for epigenetic editing to treat disorders linked to epigenetic dysregulation in aging (San Francisco, CA).	$N/A *$123M raised to date.*	$68M Series B (Mar 26, 2025)	●Ally Bridge ●Solve FHSD

C - HALLMARKS OF AGING– TELOMERE ATTRITION

Telomeric attrition signifies progressive telomere reduction—repetitive DNA/protein chromosome caps akin to shoelace guards against fray, securing data in divisions. Divisions shed segments from end-replication gaps, with sparse telomerase rebuilding in body cells (abundant in stem/reproductive), hitting thresholds triggering senescence or apoptosis. Age hastens via ROS oxidative hits on telomeres and smoking-like habits, bounding divisions and igniting instability, emphasizing extension for refresh and health. Advanced science addresses attrition with telomerase triggers lengthening caps, antioxidants checking ROS harm (vitamin C tied to extensions), and TERT gene deliveries for upkeep. Techniques defer illnesses for vibrant spans, elevate energy sans rapid drain, and guard focus from genetic jumbles.

Unattended attrition kindles expanding loops aggravating ailments. Severely short telomeres prompt fusions/breaks, destabilizing DNA and propelling shortening, injuring tissues. This amplifies cancer via chaotic growth; bolsters cardiac woes by vessel mend blocks; erodes immunity with uneven defense shortening, lifting later infection probabilities; prompts osteoporosis from depleted bone builders; and cultivates frailty via tissue erosion. Effects condense existence with condition stacks, bound healthy phases through weakness/low resilience, and abbreviate cognitive phases with neural unrest, yielding lapses/slow thought. Some new advances in research include TERT enhancers prolonging mouse lives by reversal; vitamin D connected to gradual erosion in varying research; coffee linked to sustained lengths equating younger bio-age in cohorts; and CRISPR editors tackling attrition in premature models, with lab extensions and 2025 human trials. Commercial features TA-65 by T.A. Sciences, spurring telomerase with user shortening reductions.

Wide themes such as oxidative harm or replication gaps could further illustrate attrition's aging connection. For additional information, consider these readings: "A Review of Telomere Attrition in Cancer and Aging: Current Molecular Insights and Future Therapeutic Approaches" (Cancers (Basel), 2025), "The Relationship between Telomere Length and Aging-Related Diseases" (Clinical and Experimental Medicine, 2025), and "Premature Aging and Metabolic Diseases: The Impact of Telomere Attrition" (Frontiers in Aging, 2025).

Sector	Subsector	Treatment Type	Longevity solutions		Valuation	Recent Deals	Investors	
Geroscience & Therapeutics	Epigenetic Reprogramming	mRNA-based telomere extension to restore stem cell function.	REJUVENATION TECHNOLOGIES	Rejuvenation Technologies develops nucleoside-modified TERT mRNA therapeutics to safely extend telomeres and reverse cellular aging (Mountain View, CA).	N/A $15.74M raised to date.	N/A Later Stage VC	Makai	●Makai VC
Geroscience & Therapeutics	Anti-Aging Drugs	Small molecule telomerase activators to reduce inflammation and extend healthspan.	TELOMIR	Telomir Pharmaceuticals develops Telomir-1, an oral small molecule to increase telomerase activity for age-related inflammatory diseases (Baltimore, MD)	$50.88M / $43.55M (market cap / EV) (Dec 11, 2025)	$1M PIPE (Dec 12, 2024)	STARWOOD PROPERTY TRUST	●Starwood Property Trust
Geroscience & Therapeutics	Cellular interventions	RNA therapeutics to activate telomere extension for biology disorders.	elixirgen THERAPEUTICS	Elixirgen Therapeutics develops ZSCAN4-based RNA therapeutics to extend telomeres and treat telomere shortening disorders linked to aging (Baltimore, MD)	N/A $29.11M raised to date.	$8.2M Later Stage VC (Nov 13, 2025)	N/A	N/A

C - HALLMARKS OF AGING– LOSS OF PROTEOSTASIS

Loss of proteostasis signals the erosion of cellular protein oversight—crucial units for oxygen haul, infection combat, or muscle action—ensuring correct assembly from amino acids, shaping, delivery, and faulty disposal. Age impairs as chaperones wane from oxidative hits, proteasomes lag in tagged protein shredding, and autophagy dwindles in component clearance, yielding toxic misfolds. Essential in aging, it meshes with senescence and instability, overloading cells, thus restoration vital for equilibrium and vigor. Novel approaches rebuild proteostasis by amplifying autophagy (rapalogs hindering mTOR for recycle boost), fortifying chaperones with heat shock inducers, or proteasome enhancers such as IU1 for better breakdown. Aims defer issues for extended existence, revitalize routines sans debility, and shield clarity from clumps.

Sustained proteostasis loss spawns perpetuating cycles exacerbating troubles. Misfolded clumps burden cells, spurring more errors and piles, broadening tissue harm. Contributions include Alzheimer's/Parkinson's brain plaques/tangles; sarcopenia weakening muscles; immune frailty heightening sickness; diabetes from stress overloads; and cancers evading mutant breakdowns. Impacts condense life via disease stacks, bound healthy phases with frailty/mobility drops, and hinder mental endurance with fog/recall woes. Some new research developments include autophagy amplifiers erasing mouse aggregates for health extensions; PROTACs tagging for precise elimination; mTORC1-selective blockers aiding proteostasis sans wide effects, lifting model lives; glues assisting neurodegeneration degradation; and lysosomal optimizers cutting plaques in models.

Broad ideas such as oxidative damage or autophagy may clarify proteostasis drop hastening age. For additional information, consider thes following readings: "Proteostasis Decline and Redox Imbalance in Age-Related Diseases: The Therapeutic Potential of NRF2" (Biomolecules, 2025), "Ageing, proteostasis, and the gut: Insights into neurological health and disease" (Ageing Research Reviews, 2024), and "Central role of the ER proteostasis network in healthy aging" (Trends in Cell Biology, 2025).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Anti-aging drugs	Selective mTORC1 inhibitors to regulate autophagy and proteostasis.	Aeovian Pharmaceuticals offers mTORC1 inhibitors to enhance proteostasis in age-related diseases (Berkeley, CA).	$56.52M (post valuation)	$50.42M Series A (May 13, 2024)	●Apollo Health Ventures ●Sofinnova Investments ●Hevolution Foundation
Geroscience & Therapeutics	Anti-aging drugs	Bifunctional degraders for targeted protein elimination in neurodegeneration.	C4 Therapeutics develops TORPEDO platform for degraders to improve proteostasis in aging-associated neurodegenerative conditions (Watertown, MA).	$246.14M / $115.74M (market cap / EV) (Dec 11, 2025)	$25M PIPE (Jan 04, 2024)	●Betta Pharmaceuticals
Geroscience & Therapeutics	Cellular interventions	Molecular glue degraders for targeted protein degradation in disease.	TRIANA Biomedicines offers molecular glues to degrade disease-causing proteins, supporting proteostasis in aging (Lexington, MA).	$258M (post valuation)	$120.06M Series B (Dec 3, 2025)	●Atlas Venture ●Lightspeed Venture Partners ●Bessemer Venture Partners

C - HALLMARKS OF AGING– DISABLED MACROAUTOPHAGY

Disabled macroautophagy indicates macroautophagy's faltering—the primary cell purge, with double-membrane sacs (autophagosomes) capturing proteins, aged parts such as mitochondria, and waste for lysosomal breakdown, acidic enzyme hubs recycling for nourishment and revival. Age weakens through lysosomal flaws (acidity rise curbing enzymes), mTOR excess—a growth path inhibiting start—and ROS surges disrupting merges, yielding toxic heaps blocking operations such as plugged drains. Tied to proteostasis/mitochondrial woes, it spurs inflammation/repair blocks, necessitating revival for maintenance and fortitude. Up-to-date progress revives macroautophagy with enhancers such as rapamycin mTOR curbs boosting clearance; acidity fixers for digestion; or degraders directing junk. Methods postpone failures for lengthened spans, vitalize habits without wear, and uphold acuity versus burden.

Ongoing disablement builds deteriorating loops magnifying woes. Undegraded junk strains cells, decelerating purge and heaping debris, injuring tissues. This intensifies Alzheimer's/Parkinson's brain aggregates; supports cancer via mutant linger; contributes cardiac fat vessel accruals; erodes immunity boosting elder infections via weak processing; and quickens sarcopenia from muscle protein retention. Results abbreviate life with ailment rises, limit healthy phases via declines, and fog mental endurance with neural injury, inducing haze. Some new products under development include TRPML1 agonists triggering channels for calcium release, acidifying and lifting model efficacy; autophagy degraders purging proteins; and merge boosters elevating elimination.

A deeper understanding of mTOR routes or lysosomal flaws could further elaborate on how autophagy is tied to aging. The following readings may offer additional insight: "Molecular Mechanisms of Autophagy Decline during Aging" (Cells, 2024), "Autophagy, aging, and age-related neurodegeneration" (Neuron, 2025), and "Role of autophagy in aging: The good, the bad, and the ugly" (Aging Cell, 2022).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors
Geroscience & Therapeutics	Cellular interventions	Autophagy modulators to restore protein homeostasis in degenerative diseases.	Casma Therapeuticsoffers autophagy-targeted therapies to treat age-related disorders (Cambridge, MA).	$148M (post valuation)	$75M Series C (Jul 7, 2022)	●Third Rock Ventures ●Amgen Ventures ●Astellas Venture Management
Geroscience & Therapeutics	Anti-aging drugs	Autophagy-dependent degraders for protein clearance in cancers and aging.	PAQ Therapeutics offers autophagy-based degraders to address protein dysregulation in age-associated conditions (Burlington, MA).	N/A $73M raised to date.	$39M Series B (May 7, 2025)	●MRL Ventures Fund ●Johnson & Johnson Innovation – JJDC ●BioTrack Capital
Geroscience & Therapeutics	Anti-aging drugs	Small molecules to prevent protein secretion for proteostasis.	Gate Bioscience develops small molecules that prevent extracellular protein secretion to restore proteostasis in age-related disorders, supporting macroautophagy (Brisbane, CA).	$161M (post valuation)	$65M Series B (Nov 6, 2025)	●Andreesen Horowitz ●Eli Lilly and Company ●Forbion

C - HALLMARKS OF AGING– DEREGULATED NUTRIENT SENSING

Deregulated nutrient sensing reflects progressive body system breakdowns in nutrient/energy detection and reaction with age, yielding suboptimal metabolism. Pivotal paths involve insulin for glucose intake yet resisting, spiking sugar; mTOR sensing abundance for growth/protein push, overactive; AMPK energy sensing for scarcity conservation, sensitivity waning; and sirtuins NAD+-reliant for gene/stress oversight, falling. From chronic overnutrition, sensor oxidative harm, and endocrine alterations, it breeds inefficient use accelerating age. Current research rectifies sensing by pathway adjustments, such as mTOR blockers emulating restriction for upkeep; AMPK sharpeners for handling; and sirtuins restorers via NAD+ for mends/stress. Objectives defer woes for years, bolster routines sans drain, and sustain clarity amid strains.

Uncorrected sensing crafts self-sustaining loops heightening troubles. Overactive mTOR cuts cleanup, amassing waste disrupting more, aggravating inflammation/cell fatigue and blunting diet/exercise gains. Risks rise for diabetes via resistance; obesity from fat hoards; heart ailments as AMPK vessel upkeep fails; cancer from sirtuin drops; and brain lags from energy mismatches. Effects abbreviate life through chronic heaps, bound healthy spans with vitality/adaptability dips, and hinder mental endurance via sluggishness/recall issues. Some of the cutting edge developments feature everolimus-like mTOR selectors from Novartis, akin rapamycin mouse life boosts; metformin AMPK spurs, diabetes med off-label for aging markers drop; Tru Niagen nicotinamide riboside NAD+ lifts safely, inflammation cuts in elders (with workout); and Life Extension resveratrol sirtuin spurs, variable insulin gains.

Themes such as mTOR excess or resistance could clarify how nutrient sensing directly affects aging. Some recommended readings include: "The Multifaceted Role of Nutrient Sensing and mTORC1 Signaling in Physiology and Aging" (Frontiers in Aging, 2021), "Hallmarks of Aging: An Expanding Universe" (Cell, 2023), and "Non-Genomic Hallmarks of Aging—The Review" (International Journal of Molecular Sciences, 2023).

Sector	Subsector	Treatment Type	Longevity solutions	Valuation	Recent Deals	Investors	
Geroscience & Therapeutics	Anti-aging drugs	Small molecule therapies for AMPK and mTOR pathways.	Cambrian Bio develops AMPK activators and mTOR inhibitors to correct nutrient sensing in aging. (New York, NY)	N/A $203.27M raised to date.	$23M Later Stage VC (Jan 10, 2025)	Calm Ventures FJ LABS SPRINT	●Calm Ventures ●FJ Labs ●Sprint VC
Geroscience & Therapeutics	Anti-aging drugs	Sirtuin 3 activators to enhance mitochondrial function.	CCM Biosciences develops SIRT3 activators to boost sirtuin activity for nutrient sensing in age-related diseases (Princeton, NJ).	N/A $25M raised to date.	$25M Series A (Aug 23, 2023)	N/A	N/A
Geroscience & Therapeutics	Anti-aging drugs	Pan-AMPK activators to improve metabolic balance.	Amplifier Therapeutics develops ATX-304, an AMPK activator to address deregulated nutrient sensing in metabolic agin (New York, NY).	N/A $33.25M raised to date.	$33.25M Series A (Oct 17, 2023)	FUTURE VENTURES RACAPITAL	●RA Capital Management ●Future Ventures ●Cambrian Bio

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