THE SCIENCE THAT COULD DEFINE YOUR LIFETIME

Medicine has not yet met the moment that faces us.

For the first time, it is beginning to.

Every generation has inherited its defining health challenge. Ours is the accumulated suffering of aging — the diseases that claim the people we love, one by one, as if their loss were inevitable. For the first time in human history, it may not be. This is a document about why that matters, why now, and why the people who act now are on the right side of one of the most consequential transitions in medicine.

Think of someone you love who is over sixty. A parent. A partner. A close friend. Now consider what the next twenty years look like for them — statistically, probabilistically — if nothing changes.

The cognitive decline. The cardiovascular disease. The cancer diagnosis. The slow erosion of independence, of the person you know. And now consider that **this trajectory is not inevitable.**

The biological processes driving it are **increasingly understood**, targetable, and in some cases already being targeted in human clinical trials. The scientists doing this work are not dreamers — they are some of the most rigorous researchers on earth, working at institutions like the Buck Institute, Stanford, and Columbia.

The question is no longer whether the science is real. The question is how quickly the world comes to understand that — and whether that understanding arrives in time to matter for the people we love.

55M+

People worldwide living with dementia today. That number is projected to nearly triple by 2050.

$38T

Estimated economic value of a single added year of healthy human life expectancy. A peer-reviewed figure from Nature Aging, 2021.

41M+

Americans currently serving as unpaid caregivers for a family member over 50 — forfeiting income, careers, and years of their own lives. (AARP/NAC, 2020)

THE ARGUMENT IN BRIEF

— **The Problem:** Medicine treats the symptoms of aging — one disease at a time, after it arrives. The underlying causes remain untouched.

— **The Solution:** Targeting the shared biology of aging has the potential to prevent, delay, or significantly alter the trajectory of many of these diseases simultaneously.

— **The Opportunity:** A single added year of healthy life expectancy is estimated to be worth $38 trillion to the U.S. economy. The window to shape this science is now.

The trajectory longevity science is working to change.

HISTORICAL CONTEXT

We have done this before.

Civilization has repeatedly transformed what once seemed inevitable — infectious disease, contaminated water, polio. Each breakthrough required science, but also recognition: a collective decision that the problem was no longer acceptable. And notably, each was initially resisted as an unnatural interference with the human condition. We are at that inflection point again.

WHAT IS DIFFERENT NOW

A new kind *of science.*

For most of history, medicine treated disease after it arrived — managing symptoms, slowing decline, providing comfort. The ambition was rarely cure; often, it was not possible.

Longevity science is categorically different. It asks: **what underlying biological processes cause these diseases to emerge** — and can they be interrupted, or reversed? Scientists can now map the precise mechanisms driving cancer, Alzheimer's, cardiovascular disease, and dozens of other conditions. With new tools — gene therapy, cellular reprogramming, regenerative medicine — they are beginning to target those root causes directly. This was never before possible.

A UNIFIED TARGET

These diseases share a common root.

Alzheimer's, cancer, heart disease, and diabetes are not separate misfortunes. They are different expressions of the same underlying biology — the accumulated biological deterioration of aging. Together, they constitute the primary driver of human suffering in the modern world. This is the unifying insight at the core of geroscience: that by targeting the biology of aging itself, we may be able to prevent, delay, or significantly alter the trajectory of many of these diseases together.

Alzheimer's & Dementia

No disease causes families more prolonged suffering. The slow loss of the person before the loss of the life. 7 million Americans are living with Alzheimer's. One in three seniors dies with some form of dementia.

Cardiovascular Disease

A toll so consistent we have stopped being shocked by it. Heart disease is the leading cause of death in the world — one person dies of cardiovascular disease every 34 seconds in the United States alone.

Cancer

One of the most frightening of all diagnoses. Nearly 40% of people will be diagnosed in their lifetime — and age is the single greatest risk factor, as cells accumulate the mutations that lead to malignancy.

Diabetes & Metabolic Disease

Compounds cardiovascular risk, accelerates dementia, and diminishes vitality before crises appear. 38+ million Americans have diabetes; millions more are undiagnosed.

The same cellular forces — DNA damage, chronic inflammation, the failure of cellular repair — drive all of them. Targeting those forces at their root does not address one disease at a time. It changes the terrain on which all of them emerge.

THE TOOLS NOW EXIST

The science has crossed a threshold. The progress is now.

These are not hypothetical futures. These are the tools researchers are using today — in active trials, in published research, in human beings whose biology is responding in ways unachievable just a decade ago. The pace of discovery in the last ten years has been extraordinary. What is missing is not the science. What is missing is a world prepared to receive it.

Cellular Reprogramming

Restoring youthful function to aged cells without changing their identity. In active human trials.

Senolytics

Clearing inflammation-driving "zombie" cells that accumulate with age.

Gene Therapy

Correcting DNA errors that lead to disease — targeting damage of aging at the source.

Epigenetic Medicine

Resetting gene-expression switches to reverse accumulated molecular changes.

Stem Cell & Regenerative Therapy

Repairing damaged tissues using the body's generative capacity or engineered equivalents.

AI-Driven Drug Discovery

Compressing years of therapeutic molecular discovery and analysis into months.

> *"The diseases that now define aging — Alzheimer's, cancer, cardiovascular disease — are the next chapter of the same story humanity has always written. We found a way through every time before.* The question is not whether this chapter ends well. It is how long we wait to begin writing it.

$1T+

In direct annual global treatment costs for age-related disease — falling on families, health systems, and governments, and rising every year.

41M+

Americans currently serving as unpaid caregivers for a family member over 50 — forfeiting income, careers, and years of their own lives. (AARP/NAC, 2020)

70%

Of Americans aged 65 and older will require some form of long-term care during their lifetime. (U.S. Dept. of Health & Human Services)

THE HUMAN COST

This is not a statistic. *It is someone you know.*

The cost of inaction is a parent who no longer knows your name. A partner who loses twenty years of independence before the disease takes the rest. A generation of caregivers — overwhelmingly women — who put careers and relationships on hold to manage what cannot yet be cured.

Age-related diseases do not arrive at once. They accumulate — compounding, interlocking, each one weakening the body's resistance to the next, stripping away independence and dignity in ways no number fully captures.

Age-related disease does not only steal health — it steals agency. The ability to contribute to your work, your family, your community. The years in which wisdom, creativity, and relationships are at their fullest. The people we love are not simply unwell; they are removed from the lives they built. **The science to change this trajectory is advancing.** What it needs is a world that understands it is possible — and demands it. This is not charity. It is the decision to be on the right side of the most important transition in medicine in a generation — while there is still time to shape it.

THE ECONOMIC CASE

Healthier longevity is not a burden. *It is one of the largest opportunities of our time.*

The concern that longer lives burden society has it exactly backwards. A peer-reviewed analysis in Nature Aging found that a single added year of healthy life expectancy — achieved by targeting the biology of aging — would be worth approximately **$38 trillion** to the U.S. economy. Ten healthy years: $367 trillion. Preventing these diseases simultaneously reduces the cost of suffering and generates the largest economic return in medicine's history.

> Most medical spending happens near end of life. Slowing the diseases of aging compresses illness rather than stretching it — and because these diseases share biological roots, one advance can prevent many conditions at once. The goal is not more years of frailty. It is sustained vitality followed by a sharp, late decline.
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> *Scott, Ellison & Sinclair, Nature Aging (2021) — DOI: 10.1038/s43587-021-00080-0*

THE INFLECTION POINT

Why this *window matters.*

Scientific fields have windows. There is a moment when the foundational work has matured enough to accelerate — when well-placed investments, partnerships, and influences on culture determine how quickly the world changes. Miss that window and the science advances without the cultural momentum to accelerate it — and years that could have been saved are forever lost.

Longevity science is at that window now. The Hallmarks of Aging — the field's consensus scientific framework, synthesized in a landmark 2013 paper in Cell now among the most cited in biology — are less than fifteen years old. The tools to target them have only recently become viable in human beings — the first human interventions are underway now. The decisions made in this decade will determine whether the science arrives in time for the generation that needs it most — including, for many who read this, ourselves.

The science is advancing. While the world is not keeping pace, that gap has a cost measured in years — in treatments delayed, in people who will not benefit from breakthroughs that arrive too late. Those who support longevity science today are not funding research in the abstract. They are **closing that gap** — creating the conditions that move this science from possibility to something the world is ready to understand, embrace, and accelerate — for the people we love, for ourselves, and for every generation that follows.

THE SUFFERING OF AGING

Coronary Artery Disease · Arteriosclerosis · Stroke · Chronic Obstructive Pulmonary Disease · Lung Cancer · Type 2 Diabetes · Alzheimer's Disease · Hypertensive Heart Disease · Age-Associated Sepsis · Colorectal Cancer · Chronic Kidney Disease · Atrial Fibrillation · Breast Cancer · Prostate Cancer · Heart Failure · Vascular Dementia · Parkinson's Disease · Lewy Body Dementia · Idiopathic Pulmonary Fibrosis · Pancreatic Cancer · Calcific Aortic Valve Stenosis · Myelodysplastic Syndromes · Peripheral Artery Disease · Osteoporosis · Polymyalgia Rheumatica · Temporal Arteritis · Sarcopenia · Anemia of Chronic Inflammation · Osteoarthritis · Peripheral Neuropathy · Degenerative Disc Disease · Spinal Stenosis · Macular Degeneration · Presbycusis · Cataracts · Herpes Zoster · Glaucoma · Hypothyroidism · Diverticular Disease · Urinary Incontinence · Benign Prostatic Hyperplasia · Circadian Dysrhythmia · Erectile Dysfunction · Vaginal Atrophy · Nutrient Malabsorption · Gastroesophageal Reflux Disease · Anosmia · Ageusia · Adrenopause · Dermatoporosis · Elastosis · Xerophthalmia · Xerostomia · Androgenetic Alopecia · Lentigo Senilis

We invite you to help build that bridge — while the field is young enough to shape, and advanced enough to deliver. The science has reached an inflection point. ***The question now is cultural — and that's where ALSAE's work begins.***

Why Culture Changes Everything

The emotional architecture around longevity science was built by culture — and only culture can recalibrate it. Six documented cases where behavior and policy followed storytelling, not the other way around.

Companion document: Why Culture

One Wave · Turning Culture Into an Ally

Five projects. Five initiatives. The deliberate, comprehensive infrastructure ALSAE is building — across every layer of the culture, simultaneously — and what it means to be part of it now.

Companion document: One Wave

ALSAE Foundation — alsae.org

Inspiring a Cultural Change to Transform Human Health

gary.alan@alsae.org

maria.entraigues@alsae.org

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