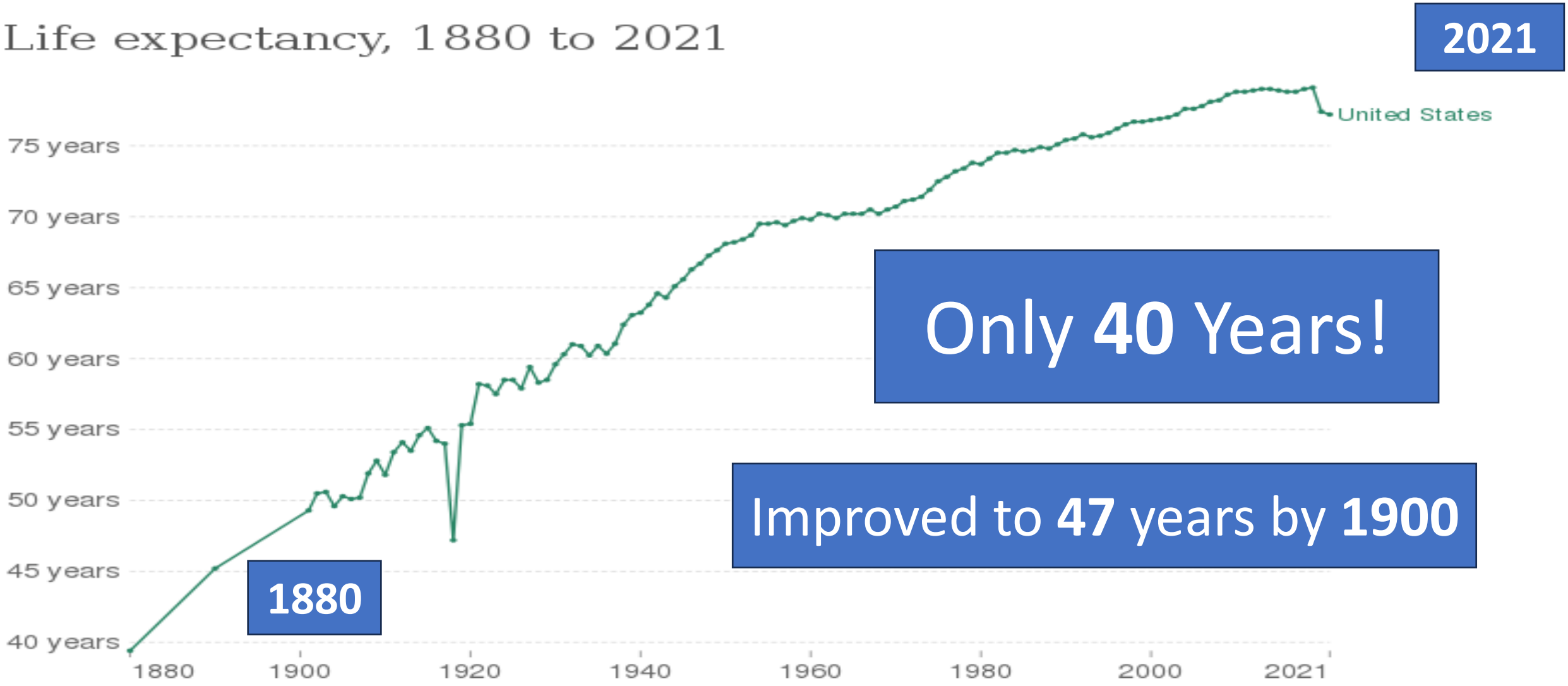
Age Reversal Research Update

Joel Kahn, MD

Kahn Center for Cardiac Longevity

Bingham Farms, MI

Life Expectancy in the United States: 1880-2021



Source: UN WPP (2022); Zijdeman et al. (2015); Riley (2005)
Note: Shown is the 'period life expectancy'. This is the average number of years a newborn would live if age-specific mortality rates in the current year were to stay the same throughout its life.

A Few Common Causes of Death in 1900

- Pneumonia
- Tuberculosis
- Diarrhea
- Diphtheria

- **Appendicitis** mortality rate about **26%** in **1900**
- **Appendicitis** mortality rate about **0.2%** in **1980**

THE WALL STREET JOURNAL. Feb 5, 2025

The Scientific Fight Over Whether Aging Is a Disease

The way we think about age is changing

"Longevity drugs, if proven to work, could slow or prevent the onset of age-related conditions rather than treating them after they develop, and eventually save millions on chronic disease spending in later life…"

https://www.wsj.com/health/wellness/aging-disease-science-medicine-6321f4a9?mod=Searchresults_pos1&page=1

The problem:

About **7,700** Americans die each day.

The major cause:

Degenerative Aging

The solution:

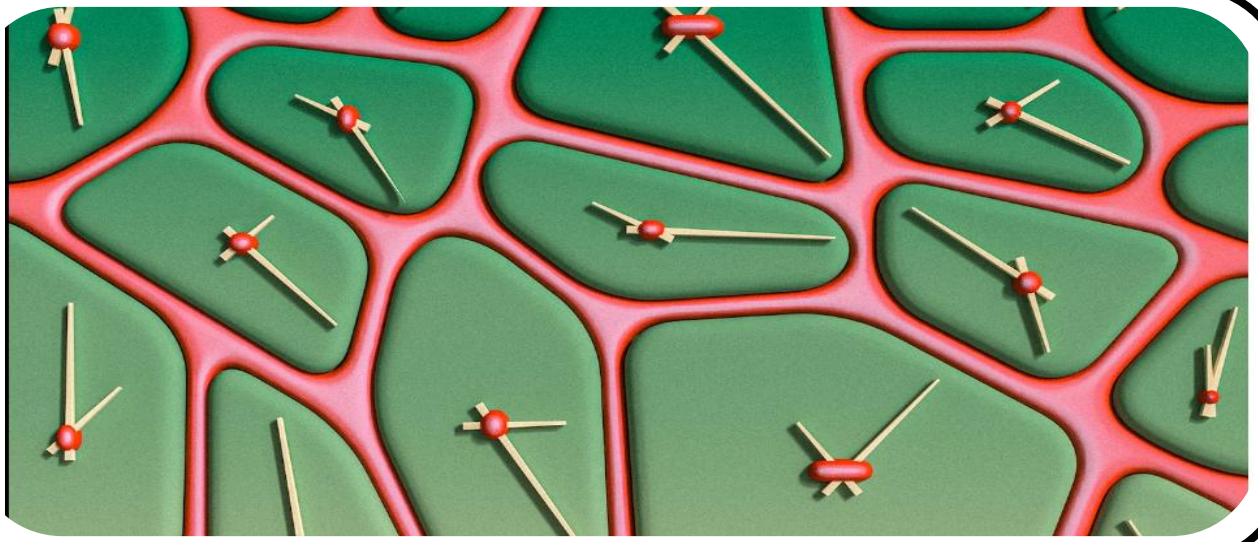
Rapidly transition **Rejuvenation Research** findings into **Humans**!

We Don't Have Time for *Delayed* Age Reversal Human Research

The Washington Post **March 6, 2025**

Inside the scientific quest to reverse human aging

Can reprogramming our genes make us young again? A breakthrough in longevity research may be nearing its first human trials.



“Cellular reprogramming is now hailed by its supporters as the most promising scientific approach to improving human healthspans and lifespans. Proponents claim it has the potential to reshape how — and whether — we grow old.”

https://www.washingtonpost.com/wellness/2025/03/06/cellular-reprogramming-longevity-reverse-aging/

“Scientists believe that by the 2030s humans could live forever.”

November 19th, 2024

“...advancing medical technology could enable **life expectancy** to **outpace** the passage of time, potentially leading to a form of **immortality**.”

https://www.msn.com/en-us/news/technology/scientists-believe-that-by-the-2030s-humans-could-live-forever/ar-AA1unGUc?

This Does Not Work!

Ignoring a sign/symptom of a disease…or avoiding diagnostics/treatment does not prevent the onset and progression degenerative illnesses.

The American Journal of CLINICAL NUTRITION
A journal of the American Society for Nutrition
May 21st, 2025

Vitamin D supplement reduced telomere shortening by 76%

https://clinicaltrials.gov/study/NCT04386577

- Study subjects received 2000 IU/day of **vitamin D** or **placebo**.
- **Vitamin D** group had roughly **76% reduction in telomere attrition** compared to **placebo.**
- This slowing of telomere shortening could represent the equivalent of about **3 fewer years** of biological aging in leukocyte telomere length over the 4-year study period.

"Telomere length attrition measures are still in the research phase and not yet fully clinically validated." They remain a laboratory measure of biological aging that vitamin D favorably influences along with improved DNA methylation (epigenetic aging) scores."

BJSM
The Journal of Sport & Exercise Medicine

Daily Walking Can Add Extra 5.3 Life Years

November 14th, 2024 / https://pubmed.ncbi.nlm.nih.gov/39542739/

Predictive modeling study suggests major longevity benefits of daily walking.

Americans over age 40 years could live an *extra* **5.3 years** on average.

Overwhelming data indicates even **small** increases in physical **activity** can significantly reduce risk of premature death, especially for the inactive.

BJSM
The Journal of Sport & Exercise Medicine

One Extra Walking Hour a Day = Six More Hours of Longer Life

Nov. 14, 2024

If the least physically inactive group walked just **1 extra hour** a day, the modeling suggests they could live about **6 extra hours*** longer for every hour they walked

*Based on the confidence interval, the actual value / amount could be as little as 5 hours or as much as 7.

https://bjsm.bmj.com/content/early/2024/10/07/bjsports-2024-108125.long

CNBC | Jan. 13th, 2025

The Mediterranean diet is the No. 1 diet for 2025: Why it's still so popular among doctors, nutritionists

https://www.cnbc.com/2025/01/13/the-mediterranean-diet-is-the-no-1-diet-for-2025-why-its-so-popular-.html

Panel of 69 experts rank Mediterranean diet #1:

Eat:

- Fruits
- Vegetables
- Whole grains
- Beans
- Nuts
- Healthy fats
- Fish
- Poultry

Limit:

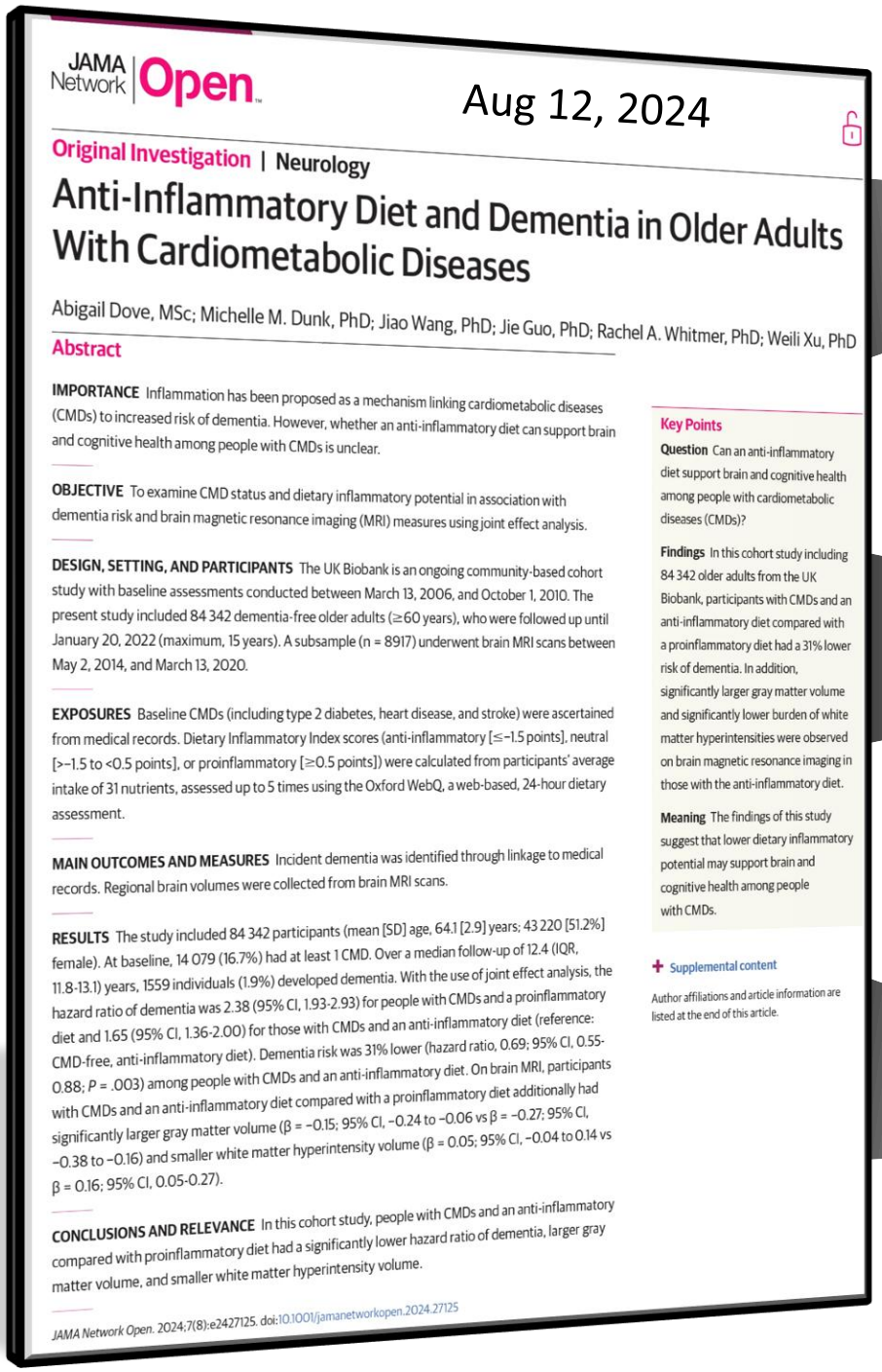
- Sweets
- Processed foods
- Red meat
- Foods cooked at high temperature

"Mediterranean diet and mortality in the elderly: a prospective cohort study and a meta-analysis"

"…high adherence to the **Mediterranean diet** was associated with **25% lower risk of death** as compared with the lowest category."

Published online by Cambridge University Press: **30 August 2018**

https://www.cambridge.org/core/journals/british-journal-of-nutrition/article/mediterranean-diet-and-mortality-in-the-elderly-a-prospective-cohort-study-and-a-metaanalysis/F2D6B083AA187849477112DB77820521



JAMA Network Open

Aug 12, 2024

Original Investigation | Neurology

Anti-Inflammatory Diet and Dementia in Older Adults With Cardiometabolic Diseases

Abigail Dove, MSc; Michelle M. Dunk, PhD; Jiao Wang, PhD; Jie Guo, PhD; Rachel A. Whitmer, PhD; Weili Xu, PhD

Abstract

IMPORTANCE Inflammation has been proposed as a mechanism linking cardiometabolic diseases (CMDs) to increased risk of dementia. However, whether an anti-inflammatory diet can support brain and cognitive health among people with CMDs is unclear.

OBJECTIVE To examine CMD status and dietary inflammatory potential in association with dementia risk and brain magnetic resonance imaging (MRI) measures using joint effect analysis.

DESIGN, SETTING, AND PARTICIPANTS The UK Biobank is an ongoing community-based cohort study with baseline assessments conducted between March 13, 2006, and October 1, 2010. The present study included 84 342 dementia-free older adults (≥60 years), who were followed up until January 20, 2022 (maximum, 15 years). A subsample (n = 8917) underwent brain MRI scans between May 2, 2014, and March 13, 2020.

EXPOSURES Baseline CMDs (including type 2 diabetes, heart disease, and stroke) were ascertained from medical records. Dietary Inflammatory Index scores (anti-inflammatory [≤−1.5 points], neutral [>−1.5 to <0.5 points], or proinflammatory [≥0.5 points]) were calculated from participants' average intake of 31 nutrients, assessed up to 5 times using the Oxford WebQ, a web-based, 24-hour dietary assessment.

MAIN OUTCOMES AND MEASURES Incident dementia was identified through linkage to medical records. Regional brain volumes were collected from brain MRI scans.

RESULTS The study included 84 342 participants (mean [SD] age, 64.1 [2.9] years; 43 220 [51.2%] female). At baseline, 14 079 (16.7%) had at least 1 CMD. Over a median follow-up of 12.4 (IQR, 11.8-13.1) years, 1559 individuals (1.9%) developed dementia. With the use of joint effect analysis, the hazard ratio of dementia was 2.38 (95% CI, 1.93-2.93) for people with CMDs and a proinflammatory diet and 1.65 (95% CI, 1.36-2.00) for those with CMDs and an anti-inflammatory diet (reference: CMD-free, anti-inflammatory diet). Dementia risk was 31% lower (hazard ratio, 0.69; 95% CI, 0.55-0.88; P = .003) among people with CMDs and an anti-inflammatory diet. On brain MRI, participants with CMDs and an anti-inflammatory diet compared with a proinflammatory diet additionally had significantly larger gray matter volume (β = −0.15; 95% CI, −0.24 to −0.06 vs β = −0.27; 95% CI, −0.38 to −0.16) and smaller white matter hyperintensity volume (β = 0.05; 95% CI, −0.04 to 0.14 vs β = 0.16; 95% CI, 0.05-0.27).

CONCLUSIONS AND RELEVANCE In this cohort study, people with CMDs and an anti-inflammatory compared with proinflammatory diet had a significantly lower hazard ratio of dementia, larger gray matter volume, and smaller white matter hyperintensity volume.

JAMA Network Open. 2024;7(8):e2427125. doi:10.1001/jamanetworkopen.2024.27125

Key Points

Question Can an anti-inflammatory diet support brain and cognitive health among people with cardiometabolic diseases (CMDs)?

Findings In this cohort study including 84 342 older adults from the UK Biobank, participants with CMDs and an anti-inflammatory diet compared with a proinflammatory diet had a 31% lower risk of dementia. In addition, significantly larger gray matter volume and significantly lower burden of white matter hyperintensities were observed on brain magnetic resonance imaging in those with the anti-inflammatory diet.

Meaning The findings of this study suggest that lower dietary inflammatory potential may support brain and cognitive health among people with CMDs.

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

End result of study published in ***JAMA*** was a **31%** lower risk of **dementia** in study subjects who ingested **nutrients** that protect against **inflammaging**.

Those who adhered most to inflammation-lowering diets had *larger* **brain** volumes and *fewer* **degenerative** pathologies.

Best ways to ward off inflammaging:

Exercise, don't smoke, maintain healthy weight/eating patterns…emphasis on **Mediterranean diet**.

Published online by JAMA Network Open: **August 12 2024**
https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2822212

CNN health

January 15th, 2025

Red Meat Associated with Increased Dementia Risk. Processed Red Meat Worse

New study published in journal *Neurology*.

Researchers found that **1+** serving of unprocessed **red meat** per day was associated with a **16% *higher* risk** of subjective **cognitive decline**, compared to **< ½** of a serving per day.

A mere **¼** serving of **processed** red meat like hot dogs was associated with a **13% *higher* risk** of **dementia**.

CNN article: https://www.cnn.com/2025/01/15/health/red-meat-dementia-wellness/index.html
***Neurology* article:** https://www.neurology.org/doi/10.1212/WNL.0000000000210286

THE WALL STREET JOURNAL. | May 17th, 2025

"Americans in Their 80s and 90s Are Redefining Old Age"

Dementia rates are down…Many thriving deep into later years.

WSJ cites numerous elderly people living exceptionally healthy.

Peter Diamandis takes 75 pills—supplements and prescription drugs a day and gets to the gym…to keep himself in shape until better interventions can…reverse the **aging** process.

Increased **life expectancy** called:

"**a true triumph of humankind**"

https://www.wsj.com/health/wellness/americans-in-their-80s-and-90s-are-redefining-old-age-5f8ae8a6

American adults with **metabolic syndrome:**

34.2%

References: Prevalence of Metabolic Syndrome in the United States National Health and Nutrition
Postgraduate Medical Journal. 2023;99(1175):985-992. doi:10.1093/postmj/qgad008.

Trends in the Prevalence of Metabolic Syndrome and Its Components in the United States 2007-2014.
International Journal of Cardiology. 2018;259:216-219. doi:10.1016/j.ijcard.2018.01.139.

Guideline on the Management of Blood Cholesterol: Journal of the American College of Cardiology. 2019;73(24):e285-e350.
doi:10.1016/j.jacc.2018.11.003.

Metabolic Syndrome Prevalence by Race/Ethnicity and Sex in the United States, National Health and Nutrition Examination Survey, 1988-2012.

Metabolic Syndrome is a clustering of Risk Factors that include:

Abdominal obesity	Hypertension
High fasting glucose	Dyslipidemia

Metabolic Syndrome is responsible for a:

- **5-fold** increased risk of **type II diabetes.**
- **2-fold** increased risk of **cardiovascular disease**
- **2-fold** increased risk of **coronary/cerebral vascular disease**
- **2.5-fold** increased risk of **cardiovascular mortality**
- **1.5-fold** increased risk of **all-cause mortality**

https://diabetesjournals.org/care/article/48/2/265/157575/Metformin-Treatment-With-or-Without-Mediterranean

United Kingdom Diabetes Study

Study results published January 1995

Type II diabetics taking metformin:

- ►32% reduced risk of diabetic complications
- ►42% reduced risk of diabetes-related death
- ►36% reduced all-cause mortality risk

British Medical Journal; Jan 14, 1995;" United Kingdom Prospective Diabetes Study (UKPDS)

Journal of the American Medical Association

JAMA Network™

Study Results Found on March 21st 2017

Metformin studied in pre-diabetic patients. Compared to placebo 850 mg of metformin two times a day:

Reduced type II diabetes risk **31%**

In patients under age 60: **metformin** reduced diabetic risk by **58%.**

Quote: ***"Metformin can cause weight loss…"***

JAMA. Published online March 21, 2017. doi:10.1001/jama.2016.17844

“Metformin treatment With or Without Mediterranean Diet for the Prevention of Age-Related Diseases in People With Metabolic Syndrome…Randomized Trial”

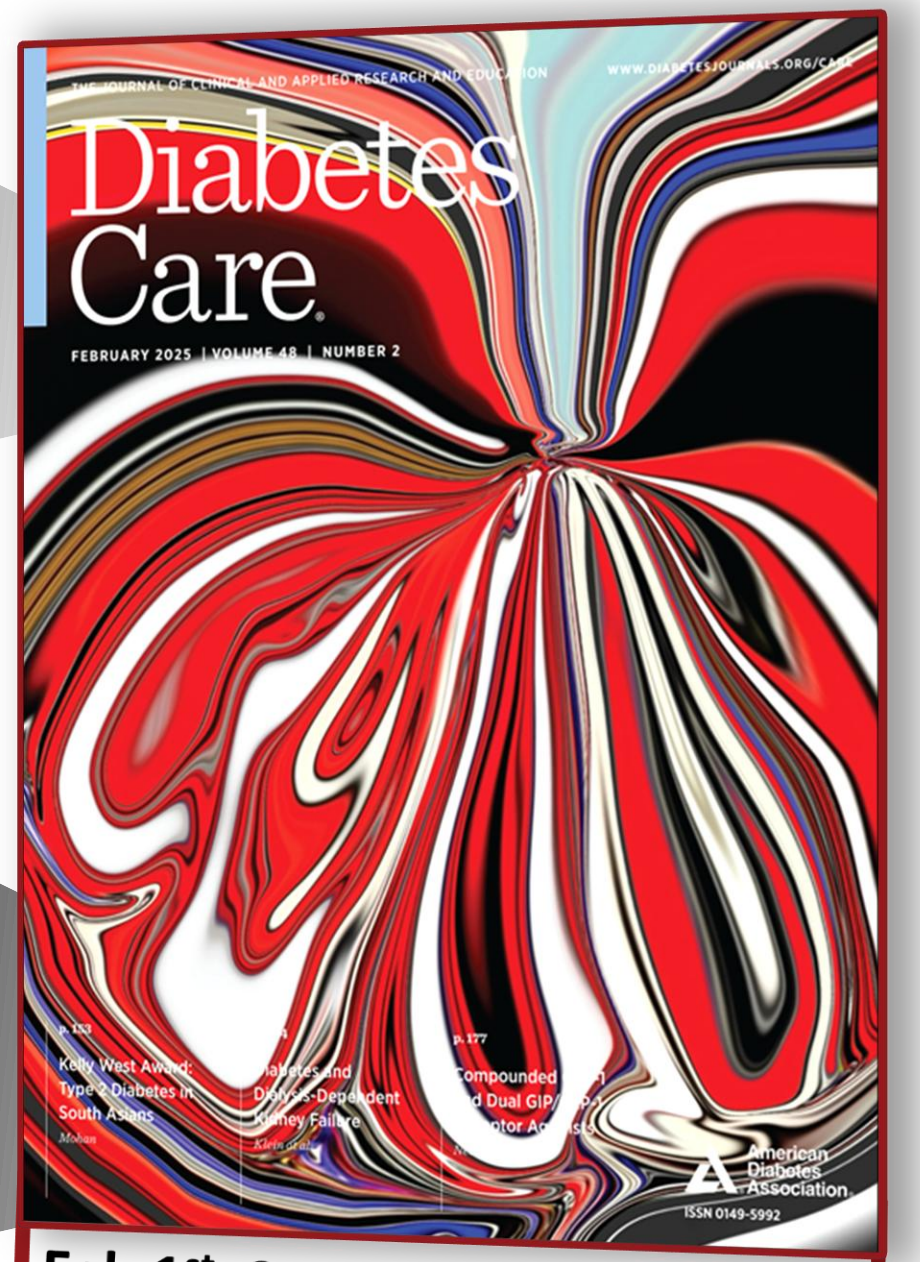
Degenerative Diseases Per 100 Person Years:

11.3 with **placebo**

13.3 with **placebo** + **Mediterranean** diet

6.9 with **metformin** alone

6.7 with **metformin** + **Mediterranean** diet



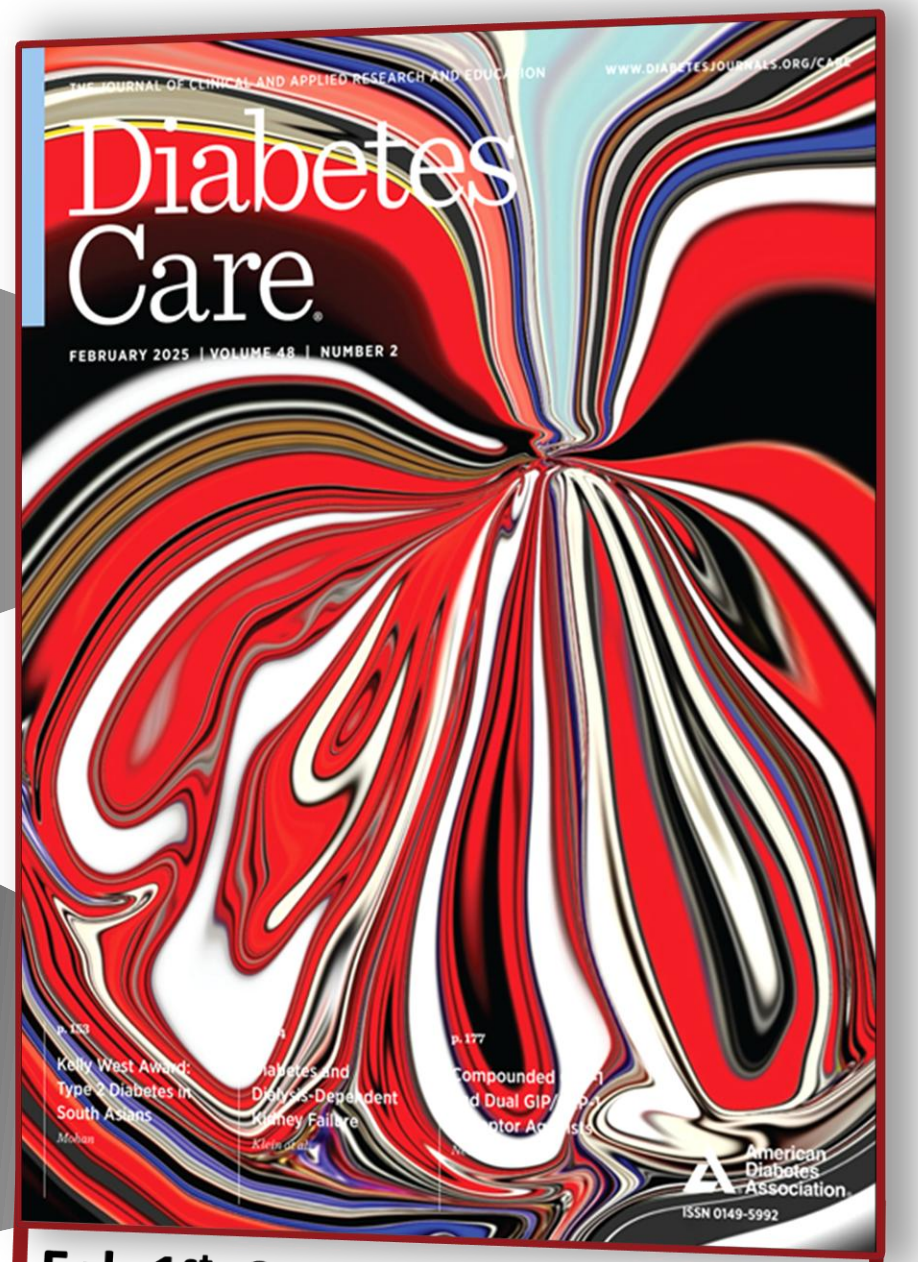
Feb 1st, 2025

https://pubmed.ncbi.nlm.nih.gov/39641916/

Impressive Prevention

Type 2 diabetes **80% lower** with **metformin** and **92% lower** with **metformin** + **Mediterranean** diet compared with placebo.

"The use of 1,700 mg/day **metformin** is effective to **prevent diabetes** in people selected on the basis of metabolic syndrome."



Feb 1st, 2025

https://pubmed.ncbi.nlm.nih.gov/39641916/

Cell

CellPress

RESOURCE · Online now, September 12, 2024

Metformin decelerates aging clock in male monkeys

- Metformin prevents brain atrophy, elevating cognitive function in aged male primates
- Metformin slows the pace of aging across diverse male primate tissues
- Metformin counteracts neuronal aging, delivering geroprotection in male primates

https://doi.org/10.1016/j.cell.2024.08.021

Cell

CellPress

Online now, September 12, 2024 | https://doi.org/10.1016/j.cell.2024.08.021

Results in Cynomolgus monkeys at human age equivalent 40–50 years:

"In a rigorous **40-month** study, we evaluated the geroprotective effects of metformin on **adult male** cynomolgus monkeys…The results highlighted a significant **slowing of aging** indicators, notably a roughly **6-year** regression in **brain aging**…"

Cell Sept. 12, 2024 | https://doi.org/10.1016/j.cell.2024.08.021

DNA methylation age beneficially reduced in monkeys treated with metformin compared to vehicle

Tissue	Epigenetic Age
– Liver	-3.95 years
– Lungs	-5.11 years
– Brain (frontal lobe)	-6.10 years

AND

"ProteinAge" appeared 6.41 years *younger*

AND

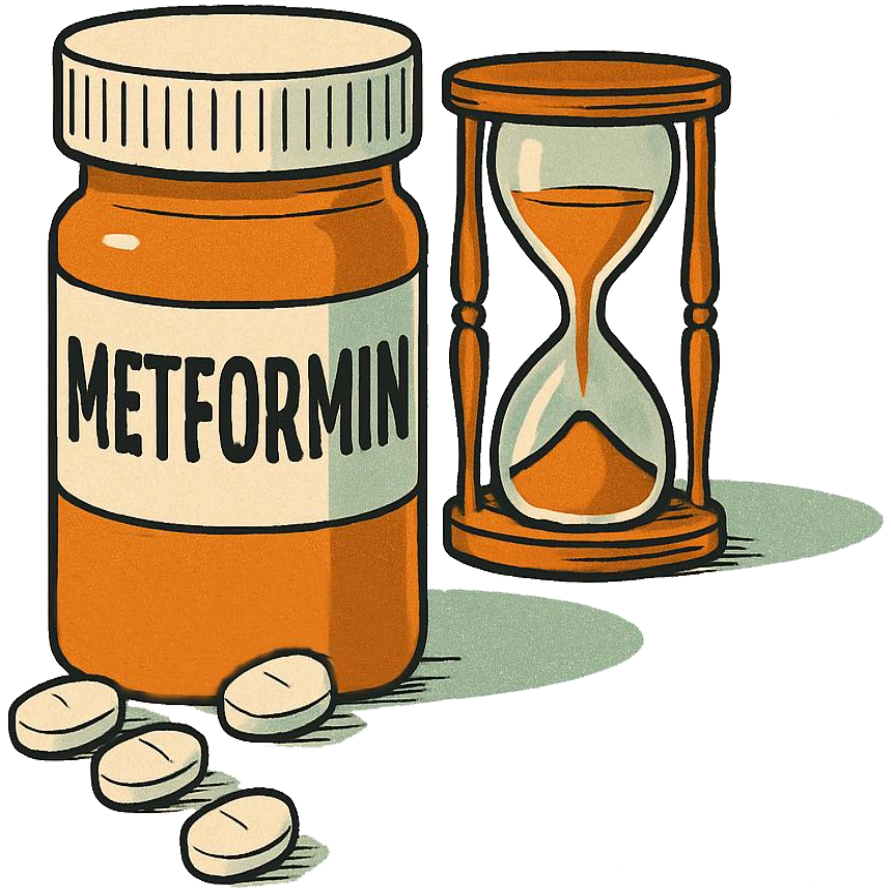
Reduced markers of cell senescence + **enhanced** neuronal regeneration

30% Lower Mortality in Diabetics on Metformin vs. Popular Alternative

May 2025

"Women initiating metformin monotherapy had a significantly lower mortality rate before age 90 compared to those on sulfonylurea monotherapy, 3.7 vs. 5.0 deaths per 100 person-years, respectively."

"This analysis is novel in targeting 'exceptional longevity' as an endpoint. By specifically examining survival to age 90, the study highlights a potential age-extending benefit of metformin beyond conventional glycemic control or cardiovascular risk mitigation."



The Journals of Gerontology May 2025

https://academic.oup.com/biomedgerontology/advance-article/doi/10.1093/gerona/glaf095/8137954?

Deadly Delays!

- **England** approves **metformin**:**1957**
- **FDA** approves **metformin**: **1994**
- **37-year delay** caused **millions** of American deaths.
- **68-years** later most people don't know **metformin** is **anti-aging** drug.

Spread the word about these delays!

A Solution:

Metformin should be widely prescribed to reduce **type II diabetes** incidence and **metabolic syndrome** morbidities/mortality.

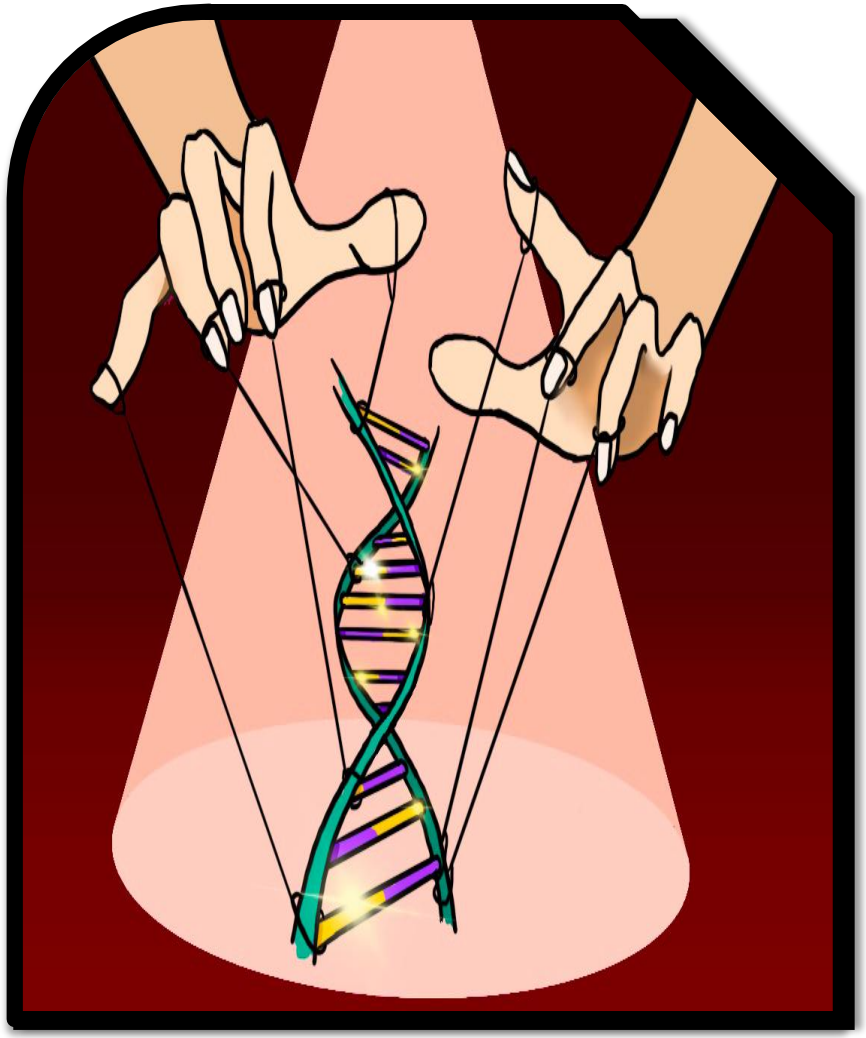
“Welcoming the Era of *Gene Editing* in Medicine”

The NEW ENGLAND JOURNAL of MEDICINE

George Q. Daly, MD, PhD
Dean of Harvard Medical School:

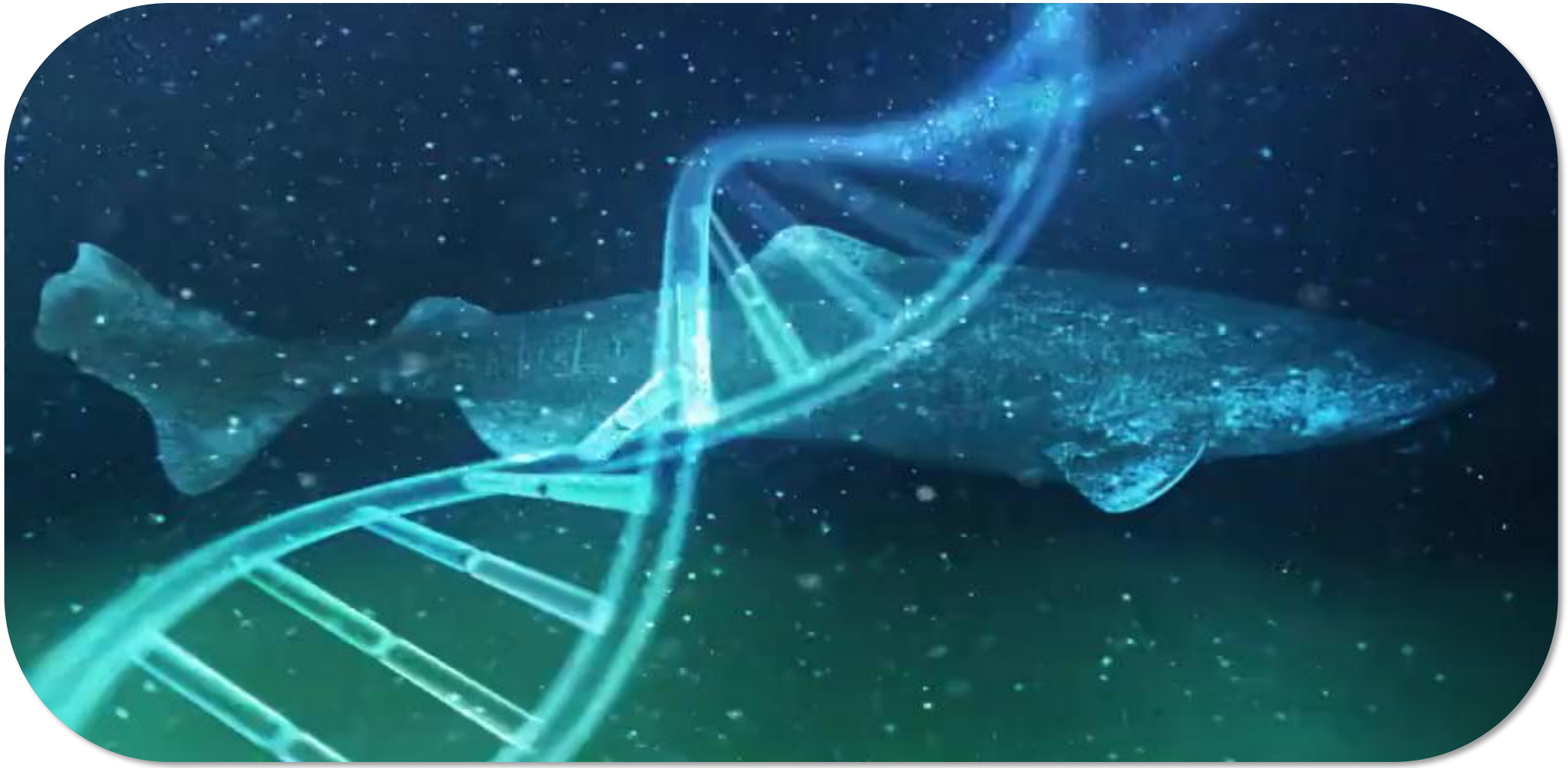
April 24th, 2024

“Given the speed of innovation and momentum from recent success, I believe efficient systemic delivery of gene-editing cargo will inevitably make its way from bench to bedside, ultimately making **gene editing** an equitable, accessible treatment method.”



https://www.nejm.org/doi/full/10.1056/NEJMp2314279

400-Year-Old Greenland Shark: Translating to Humans



https://www.cnn.com/2024/12/13/science/greenland-shark-genome-longevity-study/index.html

CNN Science

“The longest-living vertebrate could offer clues to extending the human lifespan…”

Dec. 13, 2024

92% of the Greenland shark’s **genome** has been sequenced

This allows researchers to investigate molecular **mechanisms of longevity**

Greenland sharks found to have many copies of **DNA repair** genes

This slows down the **aging process** by **fixing** damaged **DNA**

https://www.cnn.com/2024/12/13/science/greenland-shark-genome-longevity-study/index.html

CNN Science

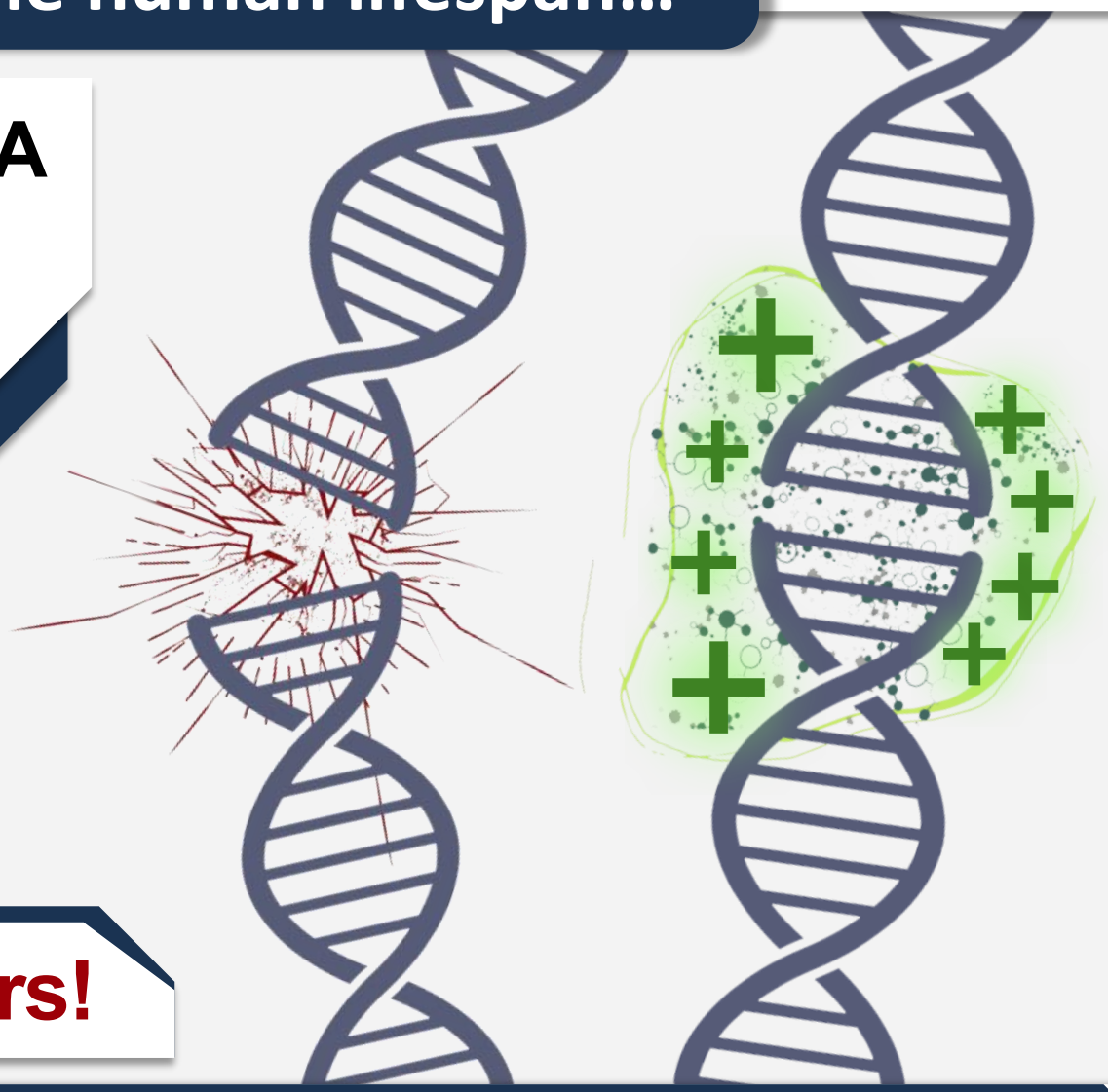
"The longest-living vertebrate could offer clues to extending the human lifespan…"

Dec. 13, 2024

Human cells experience many **DNA** strand **breaks** daily, which are addressed by **repair** mechanisms to maintain genomic stability.

Scientists may design drugs that improve human **DNA repair** to work like the Greenland shark's

These sharks may live **> 400 years!**

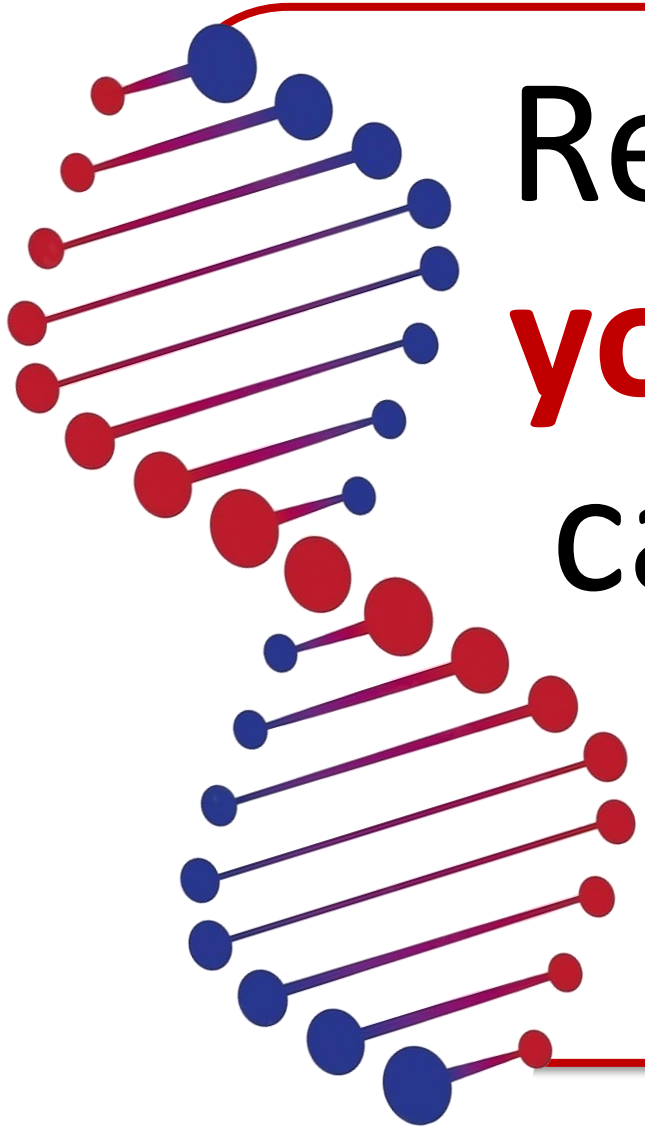


https://www.cnn.com/2024/12/13/science/greenland-shark-genome-longevity-study/index.html

Road to Reversal of Biological Aging

Restore Youthful DNA Function
using OSK genes (Yamanaka factors)

Yamanaka *Transcription Factors* –

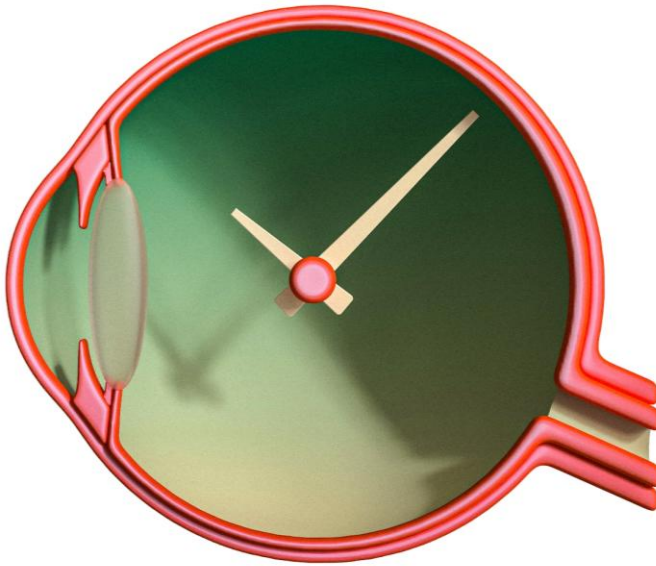


Reprogram old **cells** into **young** adult **cells** that can theoretically regenerate tissues **FOREVER** ----------

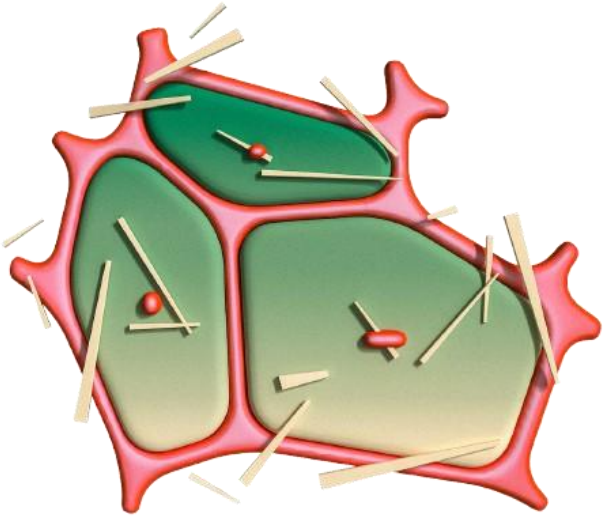
The Washington Post

March 6, 2025

"If you've never heard of cellular reprogramming, you're hardly alone. A relatively new field, it began with the jaw-dropping 2006 revelation that just four genes could return even the oldest, most decrepit cell to a state resembling youth."



"later this year, a biotech company called Life Biosciences expects to file an application with the Food and Drug Administration to get approval for the first human trial of a version of the technique."

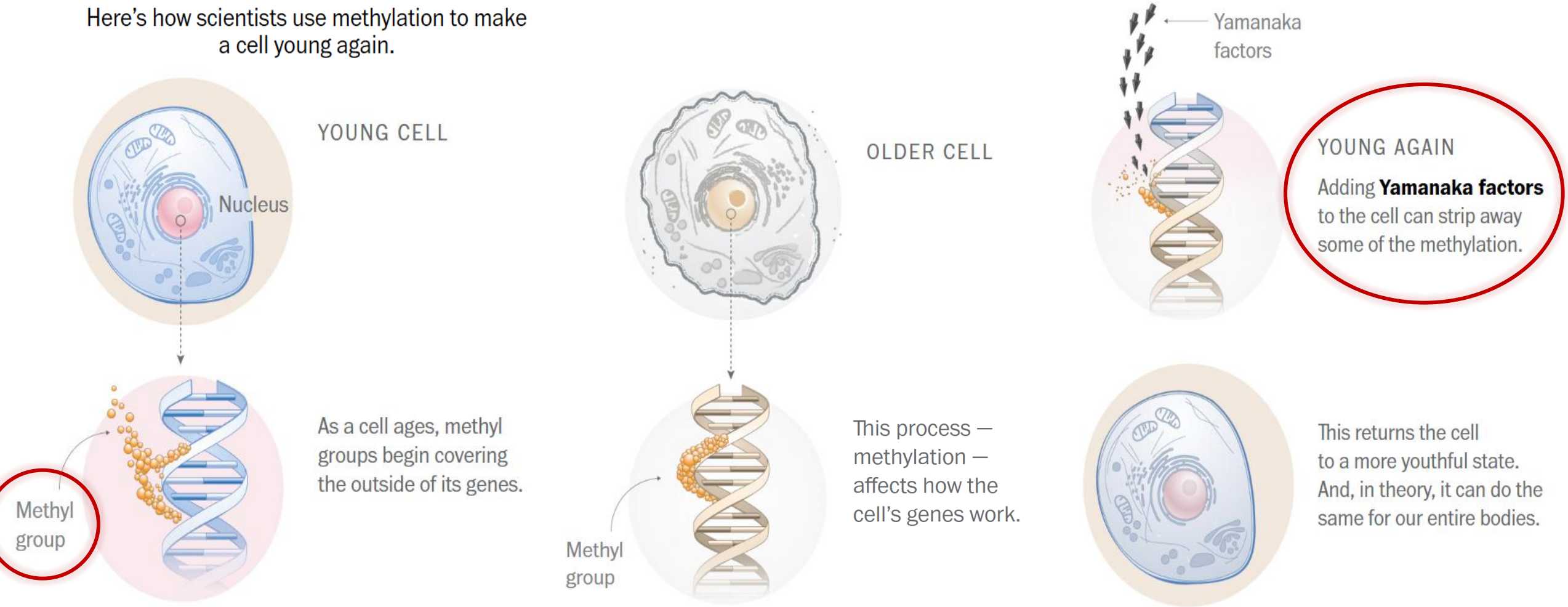


https://www.washingtonpost.com/wellness/2025/03/06/cellular-reprogramming-longevity-reverse-aging/

The Washington Post March 6, 2025

A look at how cellular reprogramming works

Here's how scientists use methylation to make a cell young again.



https://www.washingtonpost.com/wellness/2025/03/06/cellular-reprogramming-longevity-reverse-aging/

Just 3 Yamanaka Factors Reverse Aging in Live Mice in 2022-2024

Yamanaka Transcription Factors

- OCT4
- SOX2
- KLF4
- ~~cMYC~~

Acronym "OSK":

- ❑ Octamer-binding factor 4
- ❑ SRY-box factor 2
- ❑ Kruppel-like factor 4
- ~~❑ c-Myelocytoatosis~~

Original 4 Yamanaka Factors that Reversed Cell Aging Back in 2006

Yamanaka Transcription Factors

- OCT4
- SOX2
- KLF4
- cMYC

Acronym "OSKM":

- ❑ Octamer-binding factor 4
- ❑ SRY-box factor 2
- ❑ Kruppel-like factor 4
- ❑ c-Myelocytoatosis

Transcription factors are DNA-binding proteins that control **gene expression**.

Yamanaka (OSK) transcription factors

Reprogram old **cells** into young **adult cells** that can theoretically regenerate tissues **forever**.

Cells-**2006**

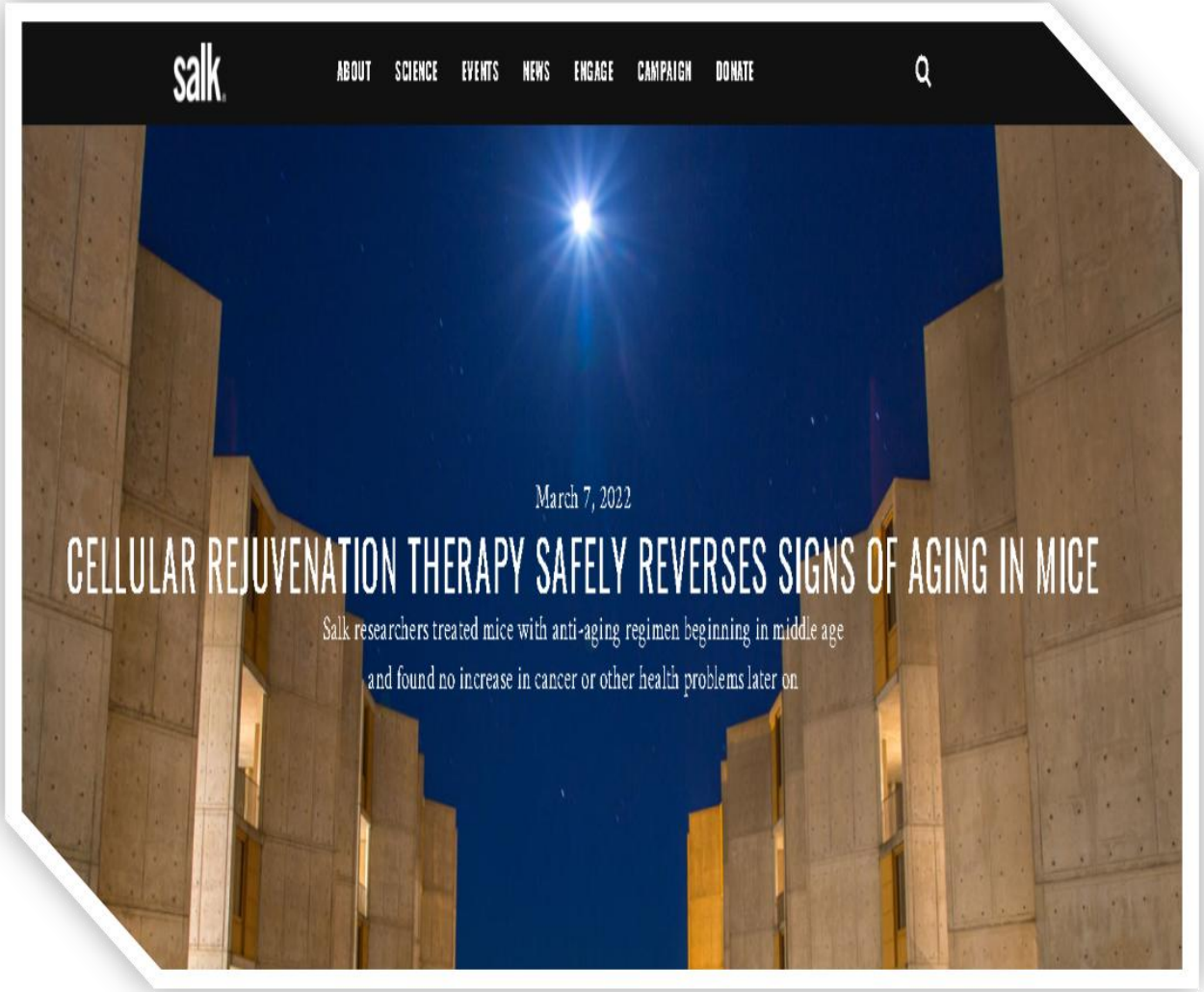
Mice-**2022-2024**

Monkeys-**2025**

Humans-**2026**

Salk Scientists Reverse Aging in Mice

March 7, 2022



"Scientists safely and effectively **reverse** the **aging process** in middle-aged and elderly mice by partially resetting their cells to more ***youthful*** states."

https://www.salk.edu/news-release/cellular-rejuvenation-therapy-safely-reverses-signs-of-aging-in-mice

Major SALK findings using Yamanka factors :

*"they found that the mice, in many ways, **resembled younger** animals."*

*"In both the kidneys and skin, the epigenetics of treated animals more closely resembled **epigenetic** patterns seen in **younger** animals."*

The Treatment Made The Mice's Cells Look Younger

https://www.salk.edu/news-release/cellular-rejuvenation-therapy-safely-reverses-signs-of-aging-in-mice/

Mary Ann Liebert, Inc. publishers
Celebrating 40 Years

"Gene Therapy-mediated Partial Reprogramming Extends Lifespan and Reverses Age-Related Changes in Aged Mice

February 15th, 2024

"Together, these results may have important implications for the development of partial reprogramming interventions to reverse **age-associated** diseases in the elderly."

https://www.liebertpub.com/doi/10.1089/cell.2023.0072

Transferring OSK Genes Inside Cells

In vivo OSK delivery methods being studied:

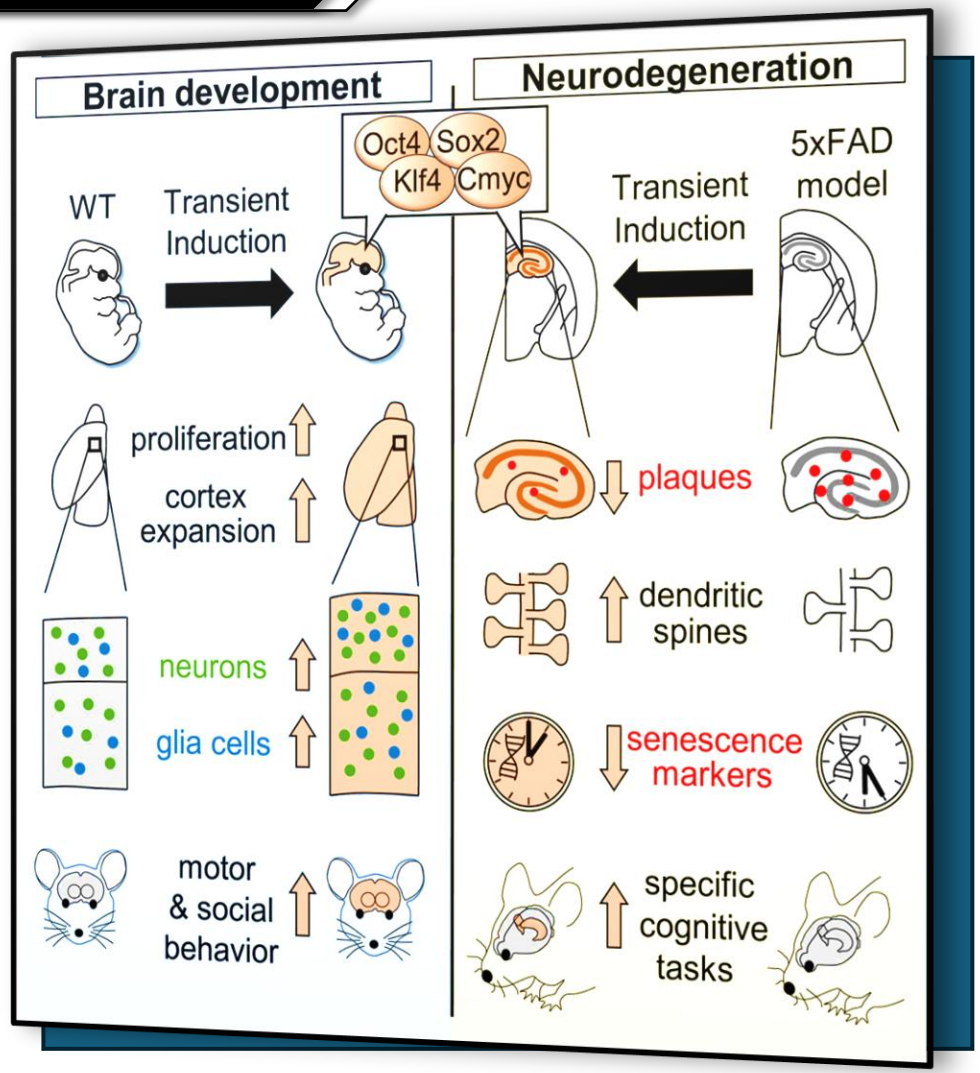
- **AAV9 vector** (adeno-associated virus)
- **Polymer & Plasmid-based vector**
- **Lipid nano-particles**
- **Chemical reprogramming**

Yamanaka factors slow cognitive decline in mouse model of Alzheimer's Disease

Mice were designed to overexpress Yamanaka factors when given doxycycline (via special gene).

Administered doxycycline for 3 days, then stopped for 4 days (3 days ON, 4 days OFF) from 12-35 weeks old.

Mice were then tested in various ways.



Cell Stem Cell October 18th, 2024

https://www.sciencedirect.com/science/article/pii/S1934590924003278

JAMA Network

Blood Tests Predict Human Longevity

May 13, 2024 https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2819335

23% death reduction with highest adherence to Mediterranean diet:

Reduced death risks were associated with:

- ✓ Lower **homocysteine, triglycerides** (other lipids)
- ✓ Lower **C-reactive protein** (other inflammatory markers)
- ✓ Lower **creatinine** (kidney)
- ✓ Lower **insulin resistance** (diabetic markers)
- ✓ Lower **body mass**
- ✓ Higher **alanine & citrate** (mitochondria & protein synthesis)

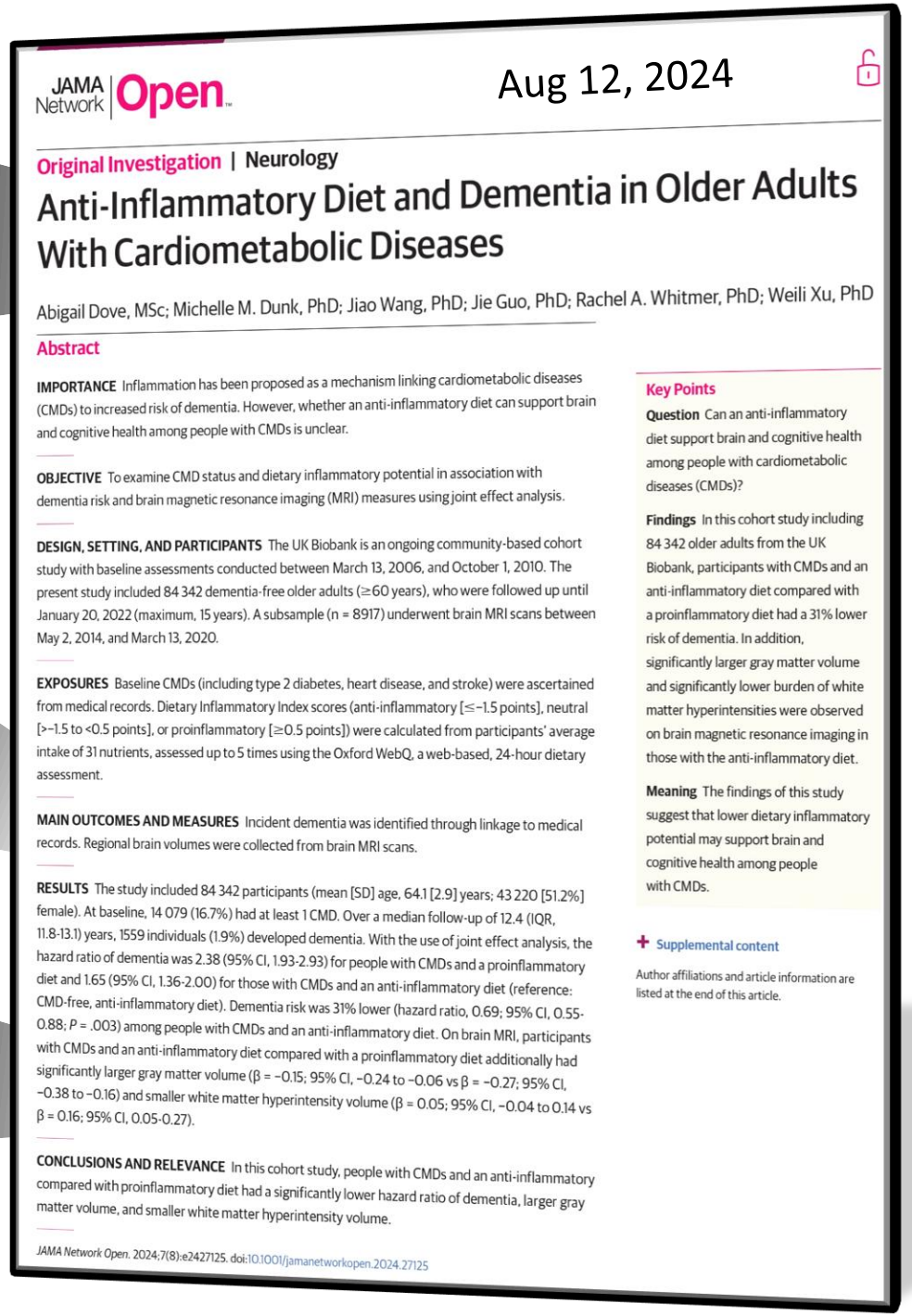
Study of 160,000 patients found people with high **C-reactive protein (CRP)** levels **7-times** more likely to **die** from ***any* cause** compared to lowest CRP.

Another study found that women with **high CRP** levels had a **70%** *greater* risk of **cardiovascular disease** or **death** over 30-year period than those with low CRP.

Takeaway

CRP may be more **accurate** predictor of vascular disease than lipids like **LDL**.

Published online by JAMA Network Open: **August 12 2024**
https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2822212



JAMA Network Open

Aug 12, 2024

Original Investigation | Neurology

Anti-Inflammatory Diet and Dementia in Older Adults With Cardiometabolic Diseases

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Abstract

IMPORTANCE Inflammation has been proposed as a mechanism linking cardiometabolic diseases (CMDs) to increased risk of dementia. However, whether an anti-inflammatory diet can support brain and cognitive health among people with CMDs is unclear.

OBJECTIVE To examine CMD status and dietary inflammatory potential in association with dementia risk and brain magnetic resonance imaging (MRI) measures using joint effect analysis.

DESIGN, SETTING, AND PARTICIPANTS The UK Biobank is an ongoing community-based cohort study with baseline assessments conducted between March 13, 2006, and October 1, 2010. The present study included 84 342 dementia-free older adults (≥60 years), who were followed up until January 20, 2022 (maximum, 15 years). A subsample (n = 8917) underwent brain MRI scans between May 2, 2014, and March 13, 2020.

EXPOSURES Baseline CMDs (including type 2 diabetes, heart disease, and stroke) were ascertained from medical records. Dietary Inflammatory Index scores (anti-inflammatory [≤−1.5 points], neutral [>−1.5 to <0.5 points], or proinflammatory [≥0.5 points]) were calculated from participants' average intake of 31 nutrients, assessed up to 5 times using the Oxford WebQ, a web-based, 24-hour dietary assessment.

MAIN OUTCOMES AND MEASURES Incident dementia was identified through linkage to medical records. Regional brain volumes were collected from brain MRI scans.

RESULTS The study included 84 342 participants (mean [SD] age, 64.1 [2.9] years; 43 220 [51.2%] female). At baseline, 14 079 (16.7%) had at least 1 CMD. Over a median follow-up of 12.4 (IQR, 11.8-13.1) years, 1559 individuals (1.9%) developed dementia. With the use of joint effect analysis, the hazard ratio of dementia was 2.38 (95% CI, 1.93-2.93) for people with CMDs and a proinflammatory diet and 1.65 (95% CI, 1.36-2.00) for those with CMDs and an anti-inflammatory diet (reference: CMD-free, anti-inflammatory diet). Dementia risk was 31% lower (hazard ratio, 0.69; 95% CI, 0.55-0.88; P = .003) among people with CMDs and an anti-inflammatory diet. On brain MRI, participants with CMDs and an anti-inflammatory diet compared with a proinflammatory diet additionally had significantly larger gray matter volume (β = −0.15; 95% CI, −0.24 to −0.06 vs β = −0.27; 95% CI, −0.38 to −0.16) and smaller white matter hyperintensity volume (β = 0.05; 95% CI, −0.04 to 0.14 vs β = 0.16; 95% CI, 0.05-0.27).

CONCLUSIONS AND RELEVANCE In this cohort study, people with CMDs and an anti-inflammatory compared with proinflammatory diet had a significantly lower hazard ratio of dementia, larger gray matter volume, and smaller white matter hyperintensity volume.

JAMA Network Open. 2024;7(8):e2427125. doi:10.1001/jamanetworkopen.2024.27125

Key Points

Question Can an anti-inflammatory diet support brain and cognitive health among people with cardiometabolic diseases (CMDs)?

Findings In this cohort study including 84 342 older adults from the UK Biobank, participants with CMDs and an anti-inflammatory diet compared with a proinflammatory diet had a 31% lower risk of dementia. In addition, significantly larger gray matter volume and significantly lower burden of white matter hyperintensities were observed on brain magnetic resonance imaging in those with the anti-inflammatory diet.

Meaning The findings of this study suggest that lower dietary inflammatory potential may support brain and cognitive health among people with CMDs.

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

THE WALL STREET JOURNAL. | May 20th, 2025

"Congratulations, You're the Oldest Person in Your Town. Now Prove It."

"People who **live beyond 100** are getting more attention than ever, with **billionaires and entrepreneurs plowing money into longevity companies** and scientists looking for treatments to **slow aging**."

https://www.wsj.com/health/wellness/longevity-aging-oldest-person-centenarian-808d1bd9?

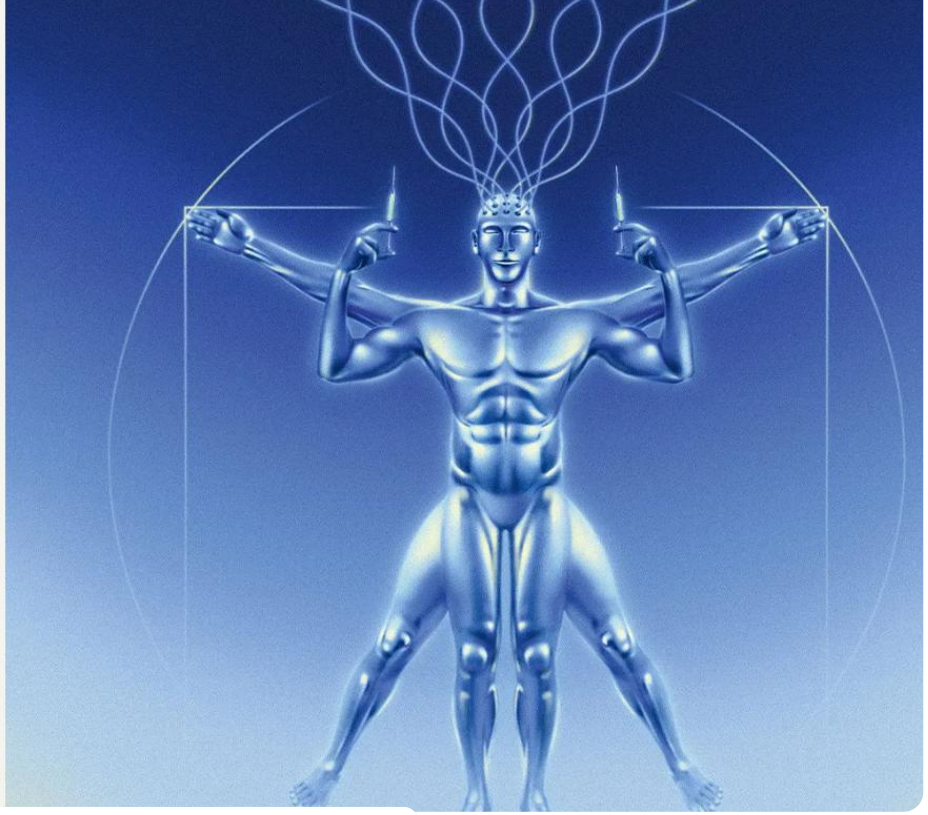
The Economist

Leaders | Humanity 2.0

How to enhance humans

Finding ways to live much longer—and better—shouldn't be left to the cranks

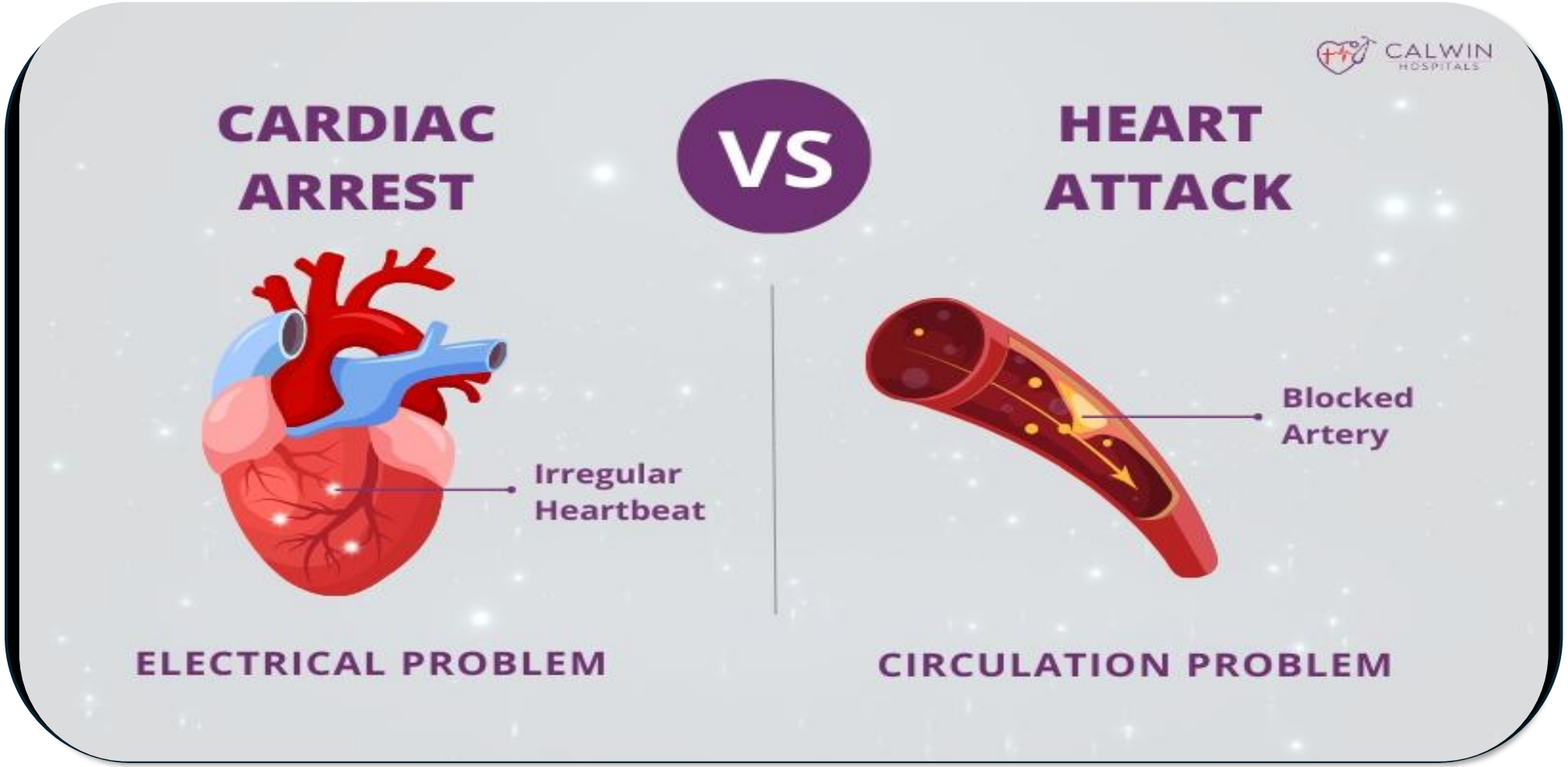
March 20th, 2025



The Economist https://www.economist.com/leaders/2025/03/20/how-to-enhance-humans

- "**Bryan Johnson** wants to **live forever**. The goal is not merely to live a few years longer. It is to **vanquish death** entirely.
- Mr Johnson and his fellows, who include **Peter Thiel** and **Elon Musk**, are exploring life extension, brain implants and drugs that enhance mind and body"

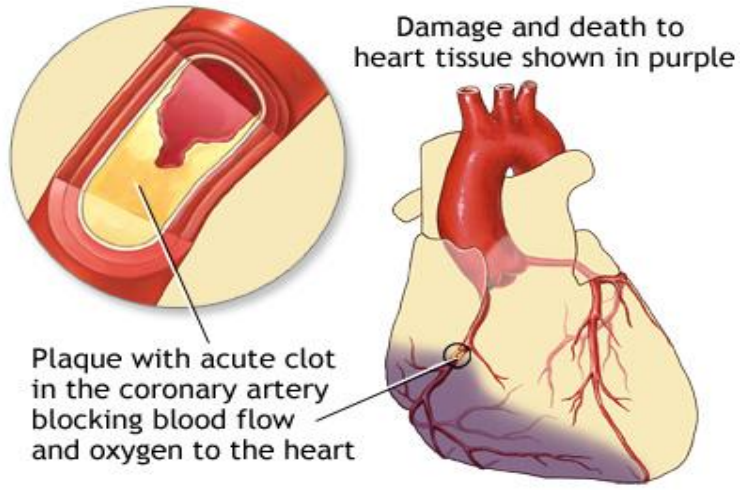
Cardiac arrest causes 300,000 to 450,000 deaths in the U.S. a year!



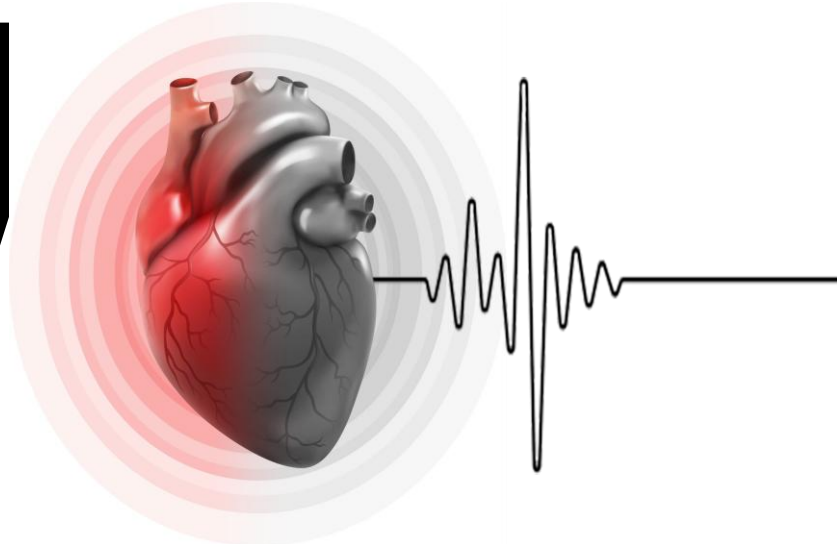
https://www.nhlbi.nih.gov/health/cardiac-arrest#:~:text=Cardiac%20arrest%20is%20a%20common,the%20United%20States%20each%20year.

What is Heart Attack vs. Cardiac Arrest?

A **heart attack** or myocardial infarction occurs when a **blockage** in a **coronary artery** that prevents oxygen-rich blood from reaching a section of the heart.



Cardiac arrest or sudden cardiac arrest refers to a sudden loss of heart activity, i.e., the heart stops pumping blood due to **irregular heartbeat** or **arrhythmia**.



https://www.calwinhospitals.in/blog/four-differences-between-a-cardiac-arrest-and-a-heart-attack/amp/

Modifiable Risk Factors and Attributable Burden of Cardiac Arrest

In a **2025** publication in the *Canadian Journal of Cardiology*, an association study sought to identify relationships between modifiable **risk factors** and risk of **sudden cardiac arrest.**[1-2]

*The researchers proposed that between **40%** and **63%** of **sudden cardiac arrest** could be **prevented** by improving modifiable risk factors, with **lifestyle** changes accounting for the **highest** proportion of **preventable** cases.*

(Study of **502,094** middle-aged and elderly people from UK Biobank with median follow-up of **13.8** years.)

1. https://academic.oup.com/exposome/article/4/1/osae001/7574628
2. https://onlinecjc.ca/article/S0828-282X(25)00171-0/fulltext

*See slide 4 for additional information on modifiable risk factor "time spent using a computer".

Example modifiable risk factors – Protective

Cardiac Arrest Risk Factor	Risk
Forced expiratory lung volume in 1 second (per IQR increment) IQR = interquartile range	↓43%
Hand grip strength (per IQR increment)	↓39%
Number of days and/or week of vigorous physical activity ≥10 min (more vs less)	↓32%
Glucosamine (more vs less)	↓20%
Leisure and/or social activities (yes vs no)	↓16%
Use of sun and/or UV protection (yes vs no)	↓16%

Example modifiable risk factors – **Adverse**

Cardiac Arrest Risk Factor	Risk
Nitrogen dioxide air pollution (per IQR increment)	↑20%
Depressed mood in past 2 weeks (more vs less)	↑25%
Sleep duration (< or >7hr vs 7hr)	↑27%
Loneliness/isolation (yes vs no)	↑30%
Weight (per IQR increment)	↑33%
Egg intake (never eat vs eat)	↑49%
Current tobacco smoking (yes vs no)	↑212%
Not Being Employed (surrogate measure of health)	↑224%

CJC Canadian Journal of Cardiology

The **2025** study found **20%** associated reduced risk of sudden cardiac arrest in **glucosamine** supplement users.[1]

American Diabetes Association. | Publications

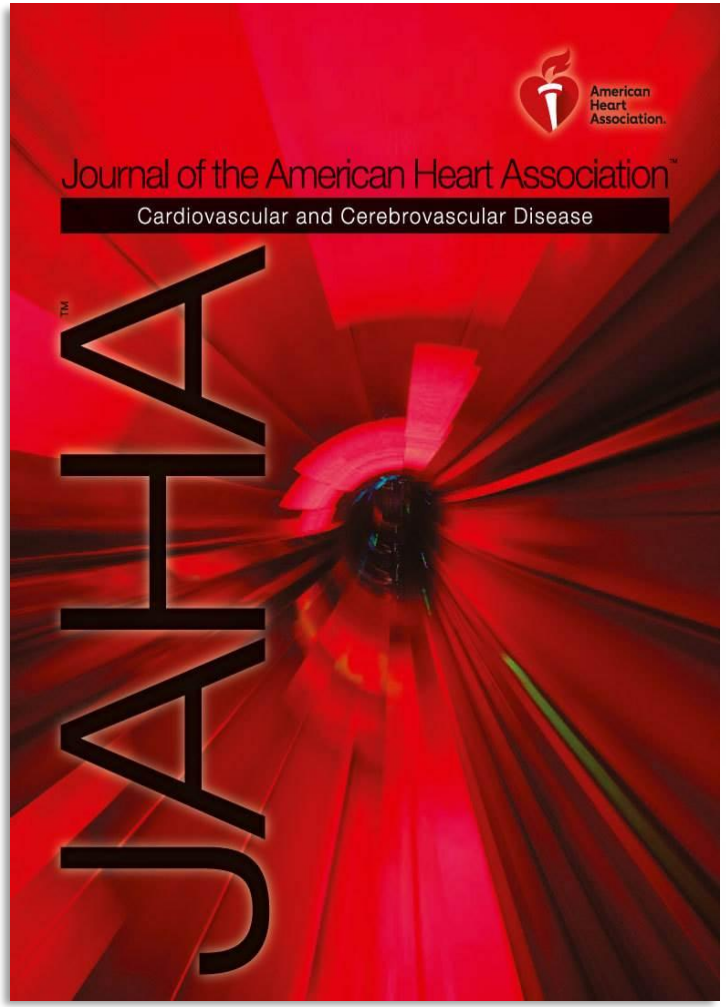
Approximately **19.1%** of the participants in a 2020 **UK Biobank** study reported regular use of **glucosamine** supplements.[2] This large data set indicates that nearly **one in five** individuals in the United Kingdom regularly uses **glucosamine**.

1. https://onlinecjc.ca/article/S0828-282X(25)00171-0/fulltext
2. Glucosamine Use, Inflammation, and Genetic Susceptibility, and Incidence of Type 2 Diabetes: A Prospective Study in UK Biobank. Ma H, Li X, Zhou T, et al. Diabetes Care. 2020;43(4):719-725. doi:10.2337/dc19-1836.

American Heart Association.

Mediterranean Diet Reduces Risk of Sudden Cardiac Death

Jun. 30, 2021



Study of 21,000 people over 9.8 years reveals:

Diet high in fried foods, organ meats and processed meats regularly had a **46% *higher*** risk of **sudden cardiac death** compared to those with least adherence.

Those who most closely followed the traditional **Mediterranean diet** had a **26% *lower*** risk of **sudden cardiac death** than those with the least adherence.

Mediterranean diet defined as high in vegetables and whole grains, low intake of meat, high intake of marine omega-3s.

https://www.ahajournals.org/doi/10.1161/JAHA.120.019158

POPULAR MECHANICS

"...Humans Will Go Backwards in Time Within Just 4 Years"

May 28th, 2025

Ray Kurzweil predicts humans will reach longevity escape velocity **within 4 years.**

If achieved and sustained over time, this could theoretically result in **ageless or biologically immortal humans.**

https://www.popularmechanics.com/science/a64906457/humans-going-backwards-in-time/