

Telomere Length

Biohacker Report

REPORT CATEGORY —



LONGEVITY

Sample Client

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DISCLAIMER

This report does not diagnose this or any other health conditions. Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

Personal information

NAME

Sample Client

SEX AT BIRTH

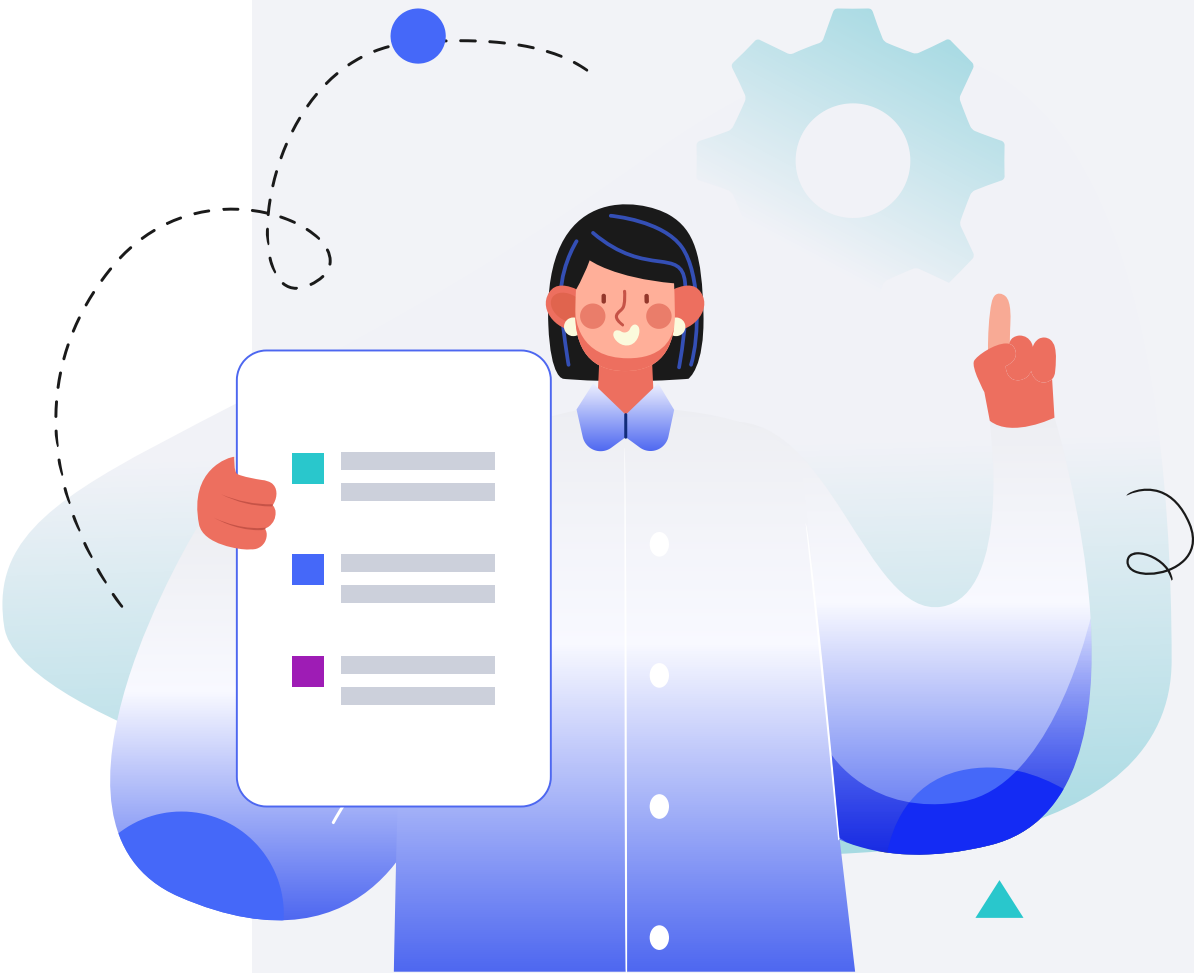
Male

HEIGHT

5ft 5" 165cm

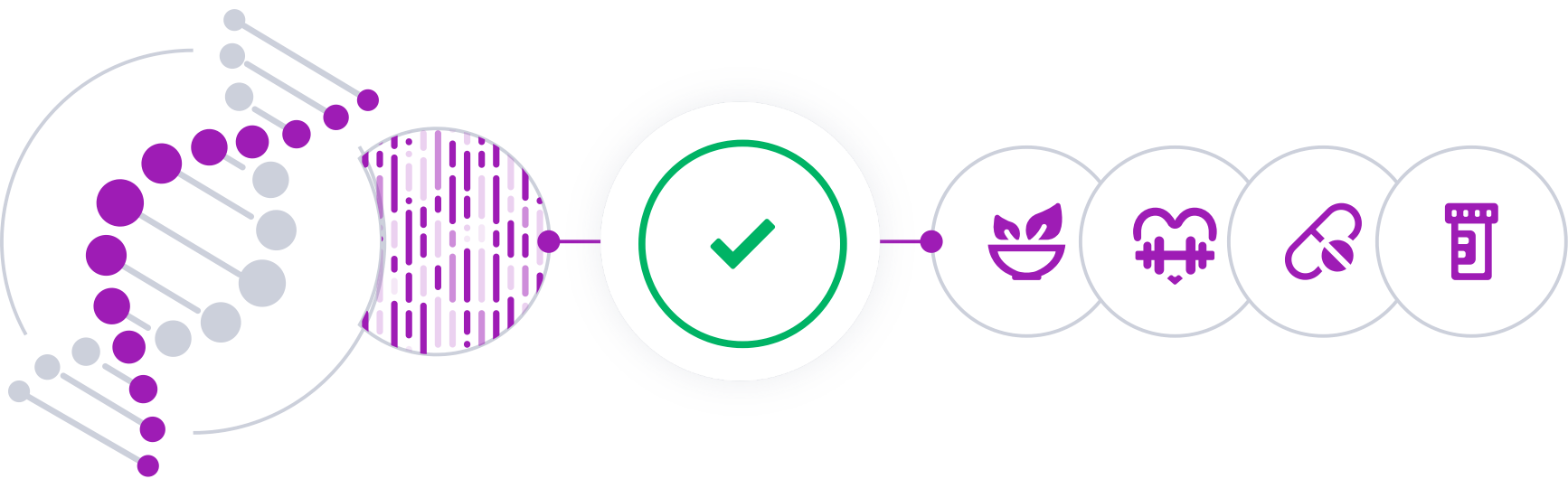
WEIGHT

137lb 62kg



How this works

Our Wellness Reports analyze how your DNA influences your health.
We then use this analysis to give you personalized risk estimates and recommendations.

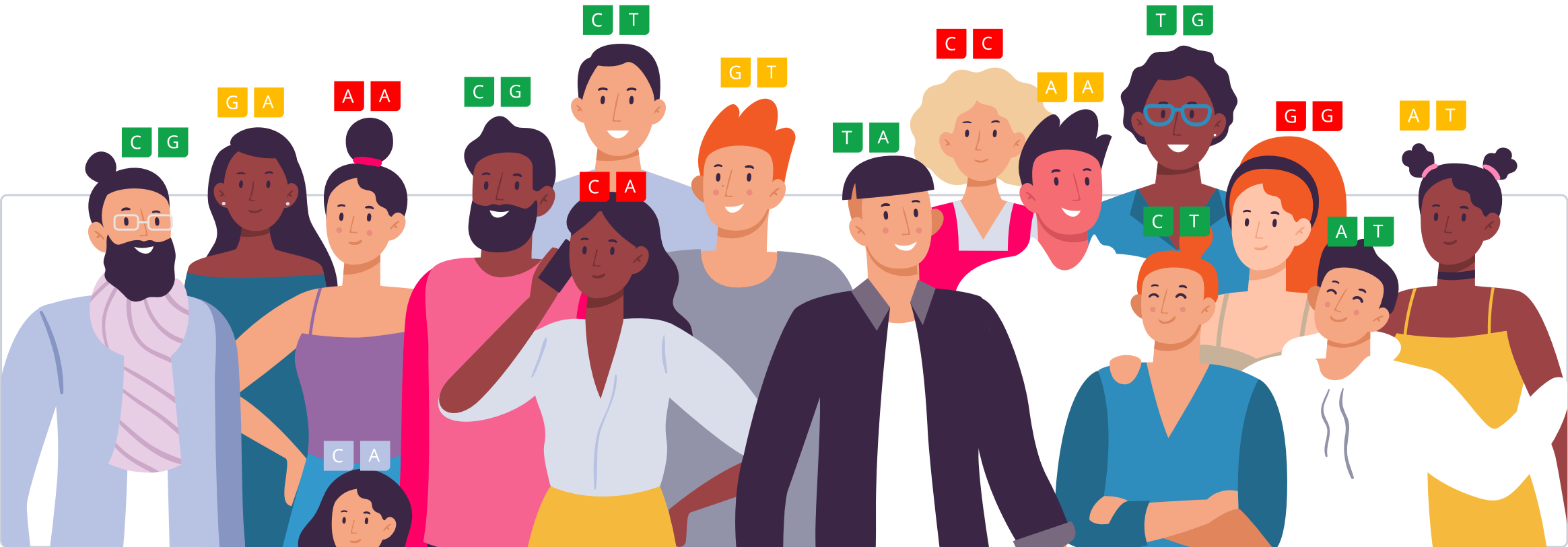


Similarly, our Trait Reports look at how your DNA influences your traits.



Your DNA is like an instruction manual — it contains a lot of information.
You can think of it as a blueprint for your body.

Genetic variants are parts of DNA that differ from person to person. Some can make you more vulnerable to certain health issues, while others may influence traits such as eye color.



We use artificial intelligence and machine learning to analyze all this information.
We then summarize your results as a risk score or display it on a gauge.

In total, we analyze up to 83 million genetic variants.

When we give a risk score, the risk icon tells you if you are at a higher or lower risk compared to other people:



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

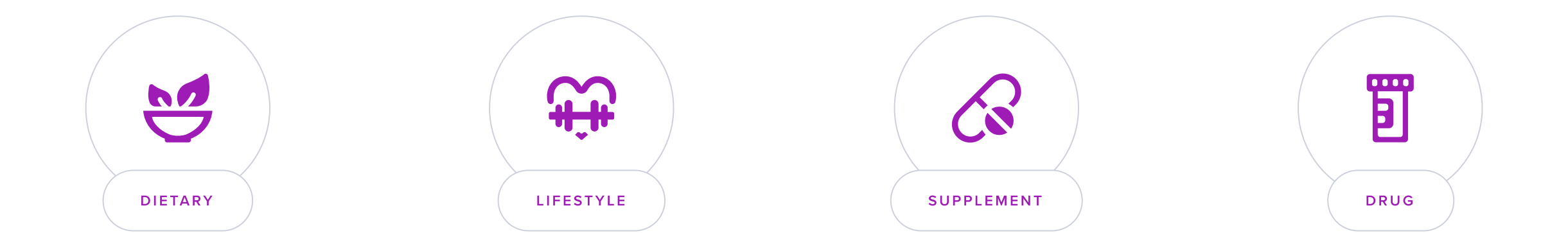
You have 2 risk alleles

Your risk is also displayed as a percentile. This will tell you how your risks compare to our sample population. The lower your percentile number, the lower your risk. The "50th percentile" would be an average risk.

Similarly, the gauge tells you your relative risk score compared to our sample population, or it indicates a specific trait or haplotype you are more likely to have based on your genetic variants.

When applicable, we also list top evidence-based recommendations that may help lower your risk. The focus is on recommendations that may be of benefit to you, based on your genetics.

Our recommendations come in four categories: lifestyle, diet, supplements and drugs.
The following icons tell you which category a recommendation falls into:



Our team of scientists also ranks each recommendation.
We rank based on impact and the strength of evidence in the medical literature.

Impact shows how strongly a recommendation will affect your health in a certain area.
Evidence is how much scientific support there is for the recommendation. Rankings are from 1 to 5 (low to high):



Impact

Impact scores range from 1-5. These scores reflect how much of an effect each recommendation can have. An impact score of 5 predicts the biggest effect.

When a recommendation affects something we can measure, we use those measurements to assign the impact score. For example, a recommendation that decreases cholesterol by 20% will have a higher impact score than one that decreases it by 5%.

Some recommendations affect things that we cannot directly measure, like stress or mood. For these, the impact score is based on how well they work relative to other recommendations and standard treatments. The best ones get the highest scores.

If there is a lot of research that shows a recommendation works especially well for your genotype, the impact score gets increased.

Recommendation Evidence

- 5 / 5
- Recommendations that are considered effective and generally recommended by experts and medical bodies.
-
- 4 / 5
- Recommendations that are considered likely effective and that have multiple independent meta-analyses and a great many studies supporting them.
-
- 3 / 5
- Recommendations that are considered possibly effective and have many studies supporting them
-
- 2 / 5
- Recommendations that have insufficient evidence, with two or several clinical trials supporting them, or many studies but with ambiguous results.
-
- 1 / 5
- Recommendations that have insufficient evidence, with a single clinical trial, or with many studies most of which didn't find support for the recommendation.
-
- 0 / 5
- No evidence in humans.

Genotype-specific Evidence

- High-quality
- Direct evidence that a recommendation helps more in people with your gene variant (many clinical trials, a few large clinical trials, or a meta-analysis).
- Medium-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a few clinical trials or one large clinical trial).
- Low-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a single clinical trial or more trials with inconsistent results).
- Indirect
- A recommendation may help more in people with your gene variant because it targets a specific gene or protein affected by your variant (e.g., MTHFR, dopamine).
- In theory
- A recommendation may help more in people with your gene variant because it targets a specific mechanism affected by your variant (e.g., inflammation, oxidative stress).

Some things to keep in mind:

- Genetics doesn’t play a considerable role in a condition or a trait.
- There is not enough research available to estimate a genetic predisposition.
- There are technical limitations to estimating or presenting a genetic predisposition.
- The topic is sensitive, and a genetic predisposition should only be estimated and presented by a healthcare professional.

Introduction

Telomere length refers to the **number of repetitive DNA sequences found at the end of each chromosome**. Telomeres serve as protective caps, preventing the loss of genetic information during cell division.

We lose a bit of DNA every time cells divide, and when they reach a certain low point, they stop functioning. So, **the longer the telomeres, the better**. Short telomeres have been linked with a number of health conditions, such as [\[R\]](#):

- Heart disease
- Diabetes
- Osteoporosis

Longer telomeres correlate with longer lifespans. However, **the research on this topic in humans is still in the early stages**.

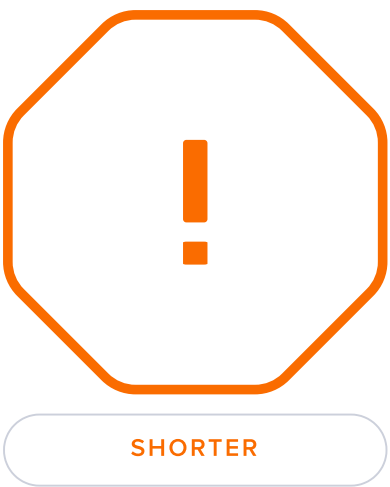
Contributing Factors

Telomeres serve as protective caps on chromosomes. As our cells divide, telomeres shorten. Hence, longer telomeres may protect against aging, and they are linked to a longer lifespan.

About 65% of differences in people's telomere length may be due to genetics [\[R\]](#).

The following dietary and lifestyle factors can contribute to telomere shortening:

- Smoking
- Obesity
- Sedentary lifestyle
- Unhealthy diet, particularly low in fiber
- Stress



Predisposed to shorter telomeres based on **277** genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
ZGPAT	rs755017	AA
STN1	rs10786775	CC
TERT	rs4449583	CC
GSTO1	rs9420907	AA
TERT	rs2736100	AC
TERT	rs7705526	CA
ENTPD5	rs59192843	TT
STMN3	rs75691080	CC
STN1	rs11191865	AG
GPR37	rs59294613	AA
CD200R1	rs2613954	TT
DCLK2	rs60160057	GA
UNC80	rs56810761	TC
/	rs6038821	AA
ASB13	rs2386642	AA
RPL7	rs28365964	TT
RFWD3	rs62053580	GA
TENT2	rs62365174	AG
CALM1	rs3213718	TC
TSPYL6	rs11125529	CC
MYNN	rs10936599	CC
MPHOSPH6	rs7194734	TT
BTN3A2	rs34991172	TT
/	rs55710439	CC
SLK	rs9419958	CC
ZNF257	rs7253490	CC
BAG6	rs2736176	GG
TGM1	rs41293836	CC
TPD52L2	rs34978822	CC
NAF1	rs4691895	GG
MPHOSPH6	rs2967374	GG
SHISAL1	rs7510583	AA

GENE	SNP	GENOTYPE
PARP1	rs3219104	CA
NKX2-3	rs7095953	TT
SENP7	rs55749605	AA
KRTAP10-4	rs7276273	AA
STMN3	rs932827	TT
TERF2	rs3785074	AA
POT1	rs7776744	GG
PROKR2	rs6107615	TT
RASGRP1	rs9972513	CT
RTEL1-TNFRSF6B	rs41309367	TT
ZGPAT	rs73624724	TT
ZNF257	rs8105767	AA
CSMD1	rs57415150	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Your Recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your genetics, along with the amount of scientific evidence supporting the recommendation.

You’ll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

		DOSAGE			DOSAGE
1	Aerobic Exercise (Cardio)	1 hour	2	Avoid Exposure To Toxic Chemicals	
3	Relaxation Techniques	30 minutes	4	Mediterranean Diet	
5	Avoid Sugary Foods & Drinks		6	Avoid PCBs	
7	Meditation	30 minutes	8	Avoid Air Pollution	
9	Omega-3 (Fish Oil)	500 mg	10	DHA (Omega-3)	200 mg
11	Avoid Pesticide Exposure		12	Mindfulness	30 minutes
13	Avoid Cadmium Exposure		14	Avoid Lead Exposure	
15	Coenzyme Q10 and Selenium		16	Selenium Supplements	50 mcg
17	Maintain Optimal Vitamin D Levels	1000 iu	18	Avoid PFAS Exposure	
19	Hydrogen Water		20	Avoid BPA (Bisphenol A) Exposure	
21	Avoid PAHs Exposure		22	Limit Coffee Intake	
23	Hyperbaric Oxygen Therapy	90 minutes	24	Astragalus	500 mg
25	Yoga	30 minutes	26	Dietary Polyphenols	
27	Mindfulness-Based Stress Reduction (MBSR)	2 hours	28	Zinc	15 mg
29	Fruits And Vegetables		30	Limit Calorie Intake	
31	Coenzyme Q10 (CoQ10)	100 mg	32	Berries	

33	Green Tea	400 mg	34	Dietary Omega-3 Fatty Acids	
35	Antioxidant Supplements		36	Vitamin C	2000 mg
37	Dietary Antioxidants		38	Methylfolate	400 mcg

1



Aerobic Exercise (Cardio)

IMPACT

4 / 5

EVIDENCE

4 / 5

How to implement

Engage in at least 150 minutes of moderate-intensity aerobic exercise or 75 minutes of vigorous-intensity activity each week. Distribute this time over at least 3 days per week, avoiding consecutive days of vigorous exercise to allow for recovery.

TYPICAL STARTING DOSE

1 hour

Description

Engaging in regular aerobic exercise, such as running, swimming, or cycling, offers numerous health benefits, including improved cardiovascular fitness, weight management, and mood enhancement. It supports overall physical and mental well-being while reducing the risk of chronic diseases.

Cardio, short for cardiovascular exercise, is any type of physical activity that temporarily increases your heart rate. Examples include **running, cycling, swimming, and brisk walking**.

Regular cardio exercise has many benefits for your overall health. It can help lower your risk of heart disease and diabetes, support weight loss, and improve your mood and energy levels. To get the most out of cardio, try to do it for at **least 30 minutes, 3-5 times a week**.

Interval training is a type of cardio that combines periods of high-intensity training with brief rest periods.

How it helps

Being physically active is associated with having longer telomeres. In line with this, elite athletes may have longer telomeres than sedentary people [\[R, R, R, R, R, R\]](#).

Exercise training may help increase telomere length. **Cardio practiced for at least 6 months may be especially effective.** In contrast, strength training may not help increase telomere length [\[R, R, R, R\]](#).

2

Avoid Exposure To Toxic Chemicals

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

To implement this recommendation, avoid using plastic containers for heating food in microwaves, choose personal care products that are free from parabens and phthalates, and use natural cleaning products whenever possible. When handling or being near chemicals such as pesticides or heavy-duty cleaners, wear protective gear such as gloves and masks. Try to reduce the use of products with strong chemical scents or aerosols. Aim to make these changes as a permanent part of your lifestyle to minimize toxic chemical exposure.

Description

Avoiding exposure to toxic chemicals, whether in household products or environmental contaminants, is crucial to prevent potential health issues, including respiratory problems, neurological effects, and long-term health risks.

Toxic chemicals are found everywhere. Short- and long-term exposure to them can be harmful to your health [\[R\]](#), [\[R\]](#), [\[R\]](#).

Short-term exposure may cause [\[R\]](#):

- Skin irritation
- Breathing problems
- Allergic reactions

Long-term exposure may contribute to [\[R\]](#), [\[R\]](#):

- Liver problems
- Reproductive issues
- Hearing loss
- Cancer

Examples of common toxic chemicals include [\[R\]](#), [\[R\]](#):

- Building materials (asbestos, formaldehyde)
- Heavy metals (lead, mercury, cadmium)
- Pesticides and herbicides (organochlorines)
- Industrial chemicals (nitriles, solvents, cleaners)

How it helps

Exposure to the following chemicals may shorten telomeres [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Pesticides
- BPA
- Heavy metals



PERSONALIZED TO YOUR GENES

Pesticide exposure may have stronger effects on telomere length in people with your [XRCC1](#) gene variant. This gene is involved in DNA repair [\[R\]](#).
Pesticide exposure may have stronger effects on telomere length in people with your [OGG1](#) gene variant. This gene is involved in DNA repair [\[R\]](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
XRCC1	rs1799782	GG	
GENE	SNP	GENOTYPE	EVIDENCE
OGG1	rs1052133	CC	

3



Relaxation Techniques

IMPACT

3 / 5

EVIDENCE

4 / 5

How to implement

Incorporate relaxation techniques such as deep breathing exercises, meditation, or yoga into your daily routine. Spend at least 15-30 minutes each day practicing one of these techniques, preferably in a quiet, comfortable space without interruptions.

TYPICAL STARTING DOSE

30 minutes

Description

Relaxation techniques encompass various methods like deep breathing, yoga, meditation, and progressive muscle relaxation, aimed at reducing stress and promoting mental and physical relaxation. Practicing these techniques regularly can help manage stress, improve mental clarity, and enhance overall emotional well-being.

We all get stressed from time to time.

[Stress](#) can help you deal with a challenge or avoid danger. However, **it’s not healthy to be stressed for a long time** [\[R, R\]](#).

Relaxation techniques such as [yoga](#) and [meditation](#) can relieve stress in different ways. Most of them focus on breathing and help you get rid of negative thoughts and emotions [\[R\]](#).

People use relaxation techniques to improve conditions like [\[R, R, R\]](#):

- Anxiety
- Depression
- Chronic pain

Progressive muscle relaxation is another relaxation technique. In this technique, you focus on tensing and relaxing different parts of your body. It is common to start with the toes and slowly work your way up to the neck and head [\[R, R\]](#).

Autogenic training is a relaxation technique that a person may carry out on their own. It uses exercises that take the mind’s attention to bodily sensations such as warmth and heaviness [\[R, R\]](#).

How it helps

High levels of perceived stress are associated with shorter telomeres [\[R, R, R, R, R, R\]](#).

Stress during childhood may shorten the telomeres even faster [\[R, R, R, R, R, R, R, R, R\]](#).

Meditation, especially mindfulness, may increase telomere length [\[R, R, R, R\]](#).

4



Mediterranean Diet

IMPACT3 / 5

EVIDENCE4 / 5

How to implement

Incorporate a variety of primarily plant-based foods, such as fruits, vegetables, whole grains, nuts, and legumes, into every meal. Choose healthy fats, like olive oil, over saturated fats and consume fish and poultry at least twice a week. Limit red meat to a few times a month and include a moderate amount of dairy products. Opt for water and red wine in moderation as your beverages.

Description

The [Mediterranean diet](#) is based on the traditional cuisine from the Mediterranean regions. It moderates the intake of red meat and dairy, while being rich in fruits and vegetables, whole grains, and healthy fats ([olive oil](#)).

The [Mediterranean diet](#) focuses on traditional cuisine from the Mediterranean regions. It’s rich in [\[R\]](#):

- [Olive oil](#)
- Fruits and vegetables
- Whole grains
- Nuts and seeds
- Fish

This type of diet may **reduce inflammation and protect the brain and heart** [\[R, R, R, R\]](#).

Limited intake of animal products, saturated fat, and refined sugar likely contribute to the health benefits of the Mediterranean diet [\[R\]](#).

How it helps

Following the Mediterranean diet is linked to having longer telomeres [\[R, R, R, R, R\]](#).

In contrast, pro-inflammatory diets high in processed foods and arachidonic acid may shorten telomeres [\[R\]](#).

5



Avoid Sugary Foods & Drinks

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

To avoid sugary foods, eliminate or significantly reduce consumption of foods and beverages high in added sugars such as sodas, candies, baked goods, and sugary cereals from your diet. Instead, opt for natural sugar sources like fruits. Aim to do this daily for ongoing health benefits.

Description

High-sugar foods like baked goods, sweets, and sugary drinks, can spike your blood sugar levels. Consuming a lot of these types of foods can contribute to health issues like diabetes, obesity, insomnia, and heart disease.

High-sugar foods and refined carbs have a high glycemic index (GI). This means they tend to spike your blood sugar levels. They include [R](#), [R](#), [R](#):

- Sugary drinks
- Baked goods
- Sweets
- White bread
- White rice
- Pasta

Eating a lot of sugary foods can contribute to:

- Diabetes [R](#), [R](#), [R](#)
- Weight gain and obesity [R](#), [R](#)
- Insomnia [R](#)
- Heart disease [R](#)

You may also want to avoid processed sugars and sugary drinks. They may have a role in increasing IL-1B [R](#), [R](#).

How it helps

Eating a diet rich in sugary foods such as **sugar-sweetened beverages, cereals, and white bread** may shorten telomeres [R](#), [R](#), [R](#).

6



Avoid PCBs

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

To avoid PCBs (Polychlorinated Biphenyls), do not use old electrical equipment manufactured before 1977, avoid consuming fish from contaminated waters, especially larger species such as shark and swordfish which are higher in the food chain, and check for and properly dispose of any old fluorescent lighting fixtures that may contain PCBs. Pay attention to local advisories regarding the safety of locally caught fish and wildlife.

Description

PCBs are toxic chemicals that can cause cancer, reproductive problems, and developmental problems. Avoiding exposure to PCBs is important for protecting your health.

Polychlorinated biphenyls (PCBs) are man-made chemicals. They were used in the industry until their **ban in 1979**. PCBs are considered **persistent organic pollutants** (POPS) due to their slow degradation in the environment. They may also **accumulate** in the food chain and the human body [\[R\]](#), [\[R\]](#).

We may be exposed to PCBs through contaminated [\[R\]](#), [\[R\]](#):

- **Food** (e.g., fish, meat, rice)
- Soil
- Air

PCBs may have toxic effects on [\[R\]](#), [\[R\]](#):

- Immunity
- Nervous system
- Reproductive system
- Hormone levels

They may also increase the risk of cancer and reduce lifespan [\[R\]](#), [\[R\]](#).

How it helps

Avoiding PCBs (harmful industrial chemicals) helps maintain telomere length, as exposure to these toxins can cause oxidative stress, which shortens telomeres. Preserving telomere length is crucial for cell health and aging well.

A [meta-analysis of 19 studies](#) associated PCB exposure and **reduced telomere length** [\[R\]](#).

A [study of 886 participants](#) associated **dietary total PCBs and exposure to dioxin-like PCBs with shorter telomeres** [\[R\]](#).

7



Meditation

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Set aside 10-20 minutes each day in a quiet space without distractions to practice meditation. Focus on your breath or perform guided meditation using an app or audio track.

TYPICAL STARTING DOSE

30 minutes

Description

Meditation is a mindfulness practice that can reduce stress, improve mental clarity, and promote relaxation. Regular meditation is associated with numerous mental and emotional health benefits, including reduced anxiety and enhanced emotional well-being.

Meditation is a relaxation technique that trains your mind to focus and redirect your thoughts. Some of the main types of meditation are [\[R\]](#):

- Mindfulness
- Focused
- Transcendental
- Mantra
- Moving

People use meditation to improve [\[R\]](#), [\[R\]](#):

- Stress and anxiety
- Mood
- Sleep disturbances
- Pain

How it helps

Meditation may help increase telomere length [\[R\]](#), [\[R\]](#).

Mindfulness meditation may be especially effective [\[R\]](#), [\[R\]](#).

8



Avoid Air Pollution

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Stay indoors on days when air quality indexes (AQI) indicate high pollution levels, which are often reported by weather services or government environmental agencies. **Install air purifiers** in your home, especially in bedrooms, to reduce indoor pollutants. Limit outdoor exercise when air pollution warnings are issued, opting for indoor activities instead.

Description

Avoiding air pollution by reducing exposure to pollutants in the environment is essential for respiratory and overall health. It can help lower the risk of respiratory diseases, cardiovascular conditions, and other health issues associated with poor air quality.

While city life is convenient in a lot of ways, it comes with some health hazards. Cars, factories, and other sources increase air [pollution](#) ^[R].

Air pollution plays a role in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Lung disease
- Heart disease
- Diabetes
- Asthma
- Skin conditions

How it helps

Exposure to air pollution may shorten the telomeres. Air pollutants associated with shorter telomeres include [\[R\]](#), [\[R\]](#):

- PM2.5
- Polychlorinated biphenyls (PCBs)

Babies born to women exposed to high levels of these pollutants may also have shorter telomeres [\[R\]](#).

Tips for lowering exposure to air pollution include [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Monitoring air pollution levels regularly
- Using an appropriate face mask when pollution levels are high
- Avoiding outdoor exercise when pollution levels are high
- Cleaning and maintaining air filtration systems
- Not burning wood or trash
- Using protective respiratory equipment at work, if needed

9



Omega-3 (Fish Oil)

IMPACT3 / 5

EVIDENCE2 / 5

How to implement

Take 1-2 g of omega-3 (fish oil) supplement daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

500 mg

Description

Omega-3 fatty acids are essential fats found in fatty fish like salmon, flaxseeds, and walnuts. They are known for their potential cardiovascular and brain health benefits, including reducing the risk of heart disease and supporting cognitive function.

[Omega-3 fatty acids](#) are some of the healthiest fats we can eat. They help lower inflammation and protect the heart, brain, and eyes. Our bodies produce less omega-3s than we need for optimal health, so it's important to get enough through food or supplements [\[R\]](#), [\[R\]](#), [\[R\]](#).

There are three major types of omega-3s: ALA, EPA, and DHA [\[R\]](#), [\[R\]](#).

Fatty fish are rich in EPA and DHA. They include [\[R\]](#):

- Salmon
- Tuna
- Herring
- Sardines

For optimal protection, try to get at least **two servings of fatty fish per week**. Fish oil supplements are available for those who don't eat fish regularly [\[R\]](#).

How it helps

Supplementation with **omega-3s (1.25-4 g/day for 6-24 weeks)** may help increase telomere length. However, the evidence is weak [\[R\]](#), [\[R\]](#).

Please note: *Fish oil can interact with blood thinners (like aspirin, Plavix, and Coumadin). Consult your doctor before taking fish oil* [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Omega-3 levels may have an especially strong link with telomere length in people with your [PLA2G2D](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
PLA2G2F	rs529143	AC	

10



DHA (Omega-3)

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take an omega-3 supplement containing DHA at a dosage of 200-500 mg daily, preferable with a meal to improve absorption. It's recommended to continue this supplementation as part of your daily regimen to support heart, brain, and joint health.

TYPICAL STARTING DOSE

200 mg

Description

DHA is an omega-3 fatty acid found in fatty fish and algae-based supplements. It is essential for brain health and has been associated with cognitive function, cardiovascular health, and reducing inflammation in the body.

An **EPA/DHA supplement** can be taken to help meet omega-3 fatty acid needs not achieved through diet. Supplement amounts are generally 250-500mg/d though there are no current official recommendations other than for ALA.

How it helps

Supplementation with omega-3s (including DHA) for 6-24 weeks may help increase telomere length. However, the evidence is weak [\[R, R\]](#).

Please note: *Fish oil can interact with blood thinners (like aspirin, Plavix, and Coumadin). Consult your doctor before taking fish oil* [\[R\]](#).

Avoid Pesticide Exposure

2 / 5

1 / 5

Purchase organic produce when possible, wash fruits and vegetables thoroughly under running water, and peel them if not organic. Use natural pest control methods instead of chemical pesticides at home and garden. Limit the use of non-organic lawn and garden chemicals.

Pesticides include all chemicals used to kill weeds, insects, fungi, and microbes. Reducing pesticide exposure involves choosing organic or pesticide-free foods and using natural pest control methods to limit contact with potentially harmful chemical residues. It supports overall health by reducing the risk of pesticide-related health issues.

- Organophosphates (glyphosate, parathion, malathion, chlorpyrifos, diazinon, phosmet)
- Neonicotinoids (imidacloprid, acetamiprid, thiacloprid, clothianidin)
- Pyrethroids (permethrin, alpha-cypermethrin)

- Fertility problems [R]
- Cognitive problems [R]
- Alzheimer's and Parkinson's disease [R, R]
- Thyroid problems [R]
- Obesity [R]
- DNA damage and cancer [R, R, R]

Occupational exposure to pesticides may be associated with shorter telomeres [R].

- Eating a variety of fruits and vegetables to avoid high exposure to one pesticide
- Buying organic food when possible
- Thoroughly washing and drying your food, even if it's labeled organic
- Scrubbing or peeling fruits and vegetables when possible
- Discarding the outer layer of leafy vegetables



PERSONALIZED TO YOUR GENES

Pesticide exposure may have stronger effects on telomere length in people with your [OGG1](#) gene variant. This gene is involved in DNA repair [\[R\]](#).
Pesticide exposure may have stronger effects on telomere length in people with your [XRCC1](#) gene variant. This gene is involved in DNA repair [\[R\]](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
OGG1	rs1052133	CC	
GENE	SNP	GENOTYPE	EVIDENCE
XRCC1	rs1799782	GG	

12



Mindfulness

IMPACT

1 / 5

EVIDENCE

3 / 5

How to implement

Set aside 5-10 minutes each day to practice mindfulness meditation. Find a quiet place, assume a comfortable seated position, close your eyes, focus on your breathing, and observe your thoughts and sensations without judgment.

TYPICAL STARTING DOSE

30 minutes

Description

Mindfulness involves paying focused and non-judgmental attention to the present moment. It can reduce stress, improve emotional regulation, and enhance overall mental clarity and well-being.

Mindfulness is the practice of being aware of the present moment. When practicing mindfulness, a person acknowledges their thoughts, feelings, and sensations without any judgment [\[R\]](#).

Mindfulness and other types of [meditation](#) may improve [\[R\]](#):

- Weight and anxiety
- Low mood
- Sleep disturbances
- Pain
- High blood pressure

How it helps

Mindfulness activities like yoga and meditation can help reduce stress, which has been associated with telomere shortening. As a result, consistently practicing mindfulness may slow down the rate at which your telomeres shorten, potentially leading to a healthier and longer life.

In a comprehensive meta-analysis of randomized controlled trials, mindfulness-based interventions (MBIs) were found to affect six immune-related biomarkers. This study observed a post-intervention reduction in C-reactive protein and interleukin-6, with an increase in CD4+ cells, telomere length, and telomerase activity. Follow-up results showed continued reductions in interleukin-6 and C-reactive protein, with an increase in CD4+ cells. The study highlights MBIs' potential in enhancing immune function, thereby impacting somatic disorders [\[R\]](#).

How to implement

Description

- Lead
- Cadmium
- Arsenic
- Chromium
- Mercury

How it helps

- Giving up smoking and avoiding secondhand smoke
- Wearing protective equipment if your job or hobbies involve handling cadmium
- Avoiding foods grown in contaminated soils as much as possible
- Ensuring an adequate intake of iron and zinc to reduce cadmium absorption

14



Avoid Lead Exposure

IMPACT1 / 5

EVIDENCE2 / 5

How to implement

Prevent lead exposure by using cold water for drinking and cooking, regularly cleaning dust from windowsills and floors, and ensuring that your home's paint is not chipping if it was built before 1978. For occupations involving potential lead exposure, use protective gear and follow safety protocols. Test your home for lead if it's old or you're concerned about contamination.

Description

Lead is a heavy metal. It is naturally found in the environment in small amounts [\[R, R\]](#).

Exposure to lead can cause it to build up in the body. A buildup of lead can contribute to oxidative stress and cell damage. This is called **lead poisoning** [\[R, R\]](#).

Lead is no longer used in the manufacturing of some products like gasoline and paint. However, it can still be found in some pipes, batteries, and the wall paint of older homes [\[R, R, R\]](#).

How it helps

Exposure to high lead levels may decrease telomere length. [\[R, R, R, R, R\]](#).

Babies born to mothers exposed to high levels of lead may have shorter telomeres. The effect may be stronger in boys [\[R, R, R, R\]](#).

However, the evidence linking lead exposure and telomere length is mixed.

Some helpful tips to reduce lead exposure include [\[R, R\]](#):

- Washing hands, tools, and toys
- Cleaning dusty surfaces
- Removing shoes before entering the house
- Running cold water for a minute before using it if your building has old plumbing with lead pipes
- Keeping your home well maintained, especially if it has lead-based paint
- Wearing protective clothing at work
- Preventing children from playing on soil
- Eating a healthy diet to reduce lead absorption

15



Coenzyme Q10 and Selenium

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 100 mg of Coenzyme Q10 and 200 mcg of Selenium daily, preferably with a meal to enhance absorption. It is advisable to continue this supplementation regimen for at least 3 to 6 months to observe potential health benefits.

Description

Coenzyme Q10 and selenium are important micronutrients that play vital roles in cellular function and antioxidant defense. Their combined use may support heart health and overall oxidative stress management.

How it helps

In a study of older Swedish citizens with low selenium levels, 42 months of selenium and coenzyme Q10 supplementation prevented telomere shortening. At baseline, telomere length did not significantly differ between the active treatment and placebo groups. However, after 42 months, the active treatment group showed less telomere shortening compared to the placebo group [\[R\]](#).

After 48 months of taking selenium yeast and coenzyme Q10 supplements, participants of another study had increased free thiols in the serum compared to the placebo group. Low free thiol levels at the start were linked to a 98% higher risk of cardiovascular mortality even after adjusting for other factors during a 10-year follow-up [\[R\]](#).

Coenzyme Q10 and selenium are powerful antioxidants that may protect the telomeres from damaging free radicals. Moreover, these supplements can enhance the activity of telomerase.

16



Selenium Supplements

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 50 mcg of selenium supplements once daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

50 mcg

Description

Selenium is a trace mineral found in Brazil nuts and many other foods as well as supplements. It is an essential nutrient that plays a crucial role in maintaining the body's antioxidant defenses and supporting thyroid function.

[Selenium](#) supports [\[R\]](#):

- Reproduction
- Thyroid function
- DNA production
- Immune response

Adults should be getting **55 micrograms** of selenium per day. Selenium supplements are available for people who can't meet their needs with a balanced diet [\[R\]](#).

How it helps

In a study of older Swedish citizens aged with low selenium levels, 42 months of selenium and coenzyme Q10 supplementation prevented telomere shortening. At baseline, telomere length did not significantly differ between the active treatment and placebo groups. However, after 42 months, the active treatment group showed less telomere shortening compared to the placebo group [\[R\]](#).

After 48 months of taking selenium yeast and coenzyme Q10 supplements, participants of another study had increased free thiols in the serum compared to the placebo group. Low free thiol levels at the start were linked to a 98% higher risk of cardiovascular mortality even after adjusting for other factors during a 10-year follow-up [\[R\]](#).

Selenium may help by reducing oxidative damage to the telomeres.

17



Maintain Optimal Vitamin D Levels

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Check your vitamin D levels, they should ideally be in the 30-66 ng/mL range. If your levels are lower than that, take a vitamin D supplement, 1000-4000 IU daily, to reach an optimal range.

TYPICAL STARTING DOSE

1000 iu

Description

Vitamin D, often referred to as the "sunshine vitamin," can be synthesized by the skin when exposed to sunlight, as well as being found in fish, eggs, and fortified milk. It helps regulate calcium absorption, promoting strong bones and a healthy immune system. Vitamin D deficiency can lead to conditions like rickets in children and osteoporosis in adults.

Your body needs [vitamin D](#) for strong bones. Vitamin D also plays a role in [\[R\]](#):

- Mood
- Immunity
- Heart health
- Blood sugar control

[Sunlight](#) is our main source of vitamin D. Experts recommend getting at least **5-15 minutes of midday sun, 2-3 times per week**. People with darker skin and those living at high latitudes may need longer periods of sun exposure [\[R\]](#), [\[R\]](#).

Foods like fish, eggs, and fortified milk provide small amounts of vitamin D. **People lacking vitamin D should consider taking a supplement** [\[R\]](#).

How it helps

Supplementation with vitamin D (800 IU/day) for 12 months increased telomere length in a placebo-controlled trial of 183 older adults with mild cognitive impairment [\[R\]](#).

Vitamin D may help by increasing telomerase activity, as seen in a trial of 37 overweight African Americans [\[R\]](#).

Please note: *Experts recommend getting 600-800 IU of vitamin D per day. Medical bodies recommend against taking more than 4,000 IU per day* [\[R\]](#).

18



Avoid PFAS Exposure

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

To avoid PFAS exposure, choose products that are labeled PFAS-free, especially when selecting cookware, cosmetics, and clothing. Reduce the consumption of packaged and fast foods since the packaging often contains PFAS. Use a water filter that is certified to remove PFAS compounds for your drinking and cooking water.

Description

Avoiding per- and polyfluoroalkyl substances (PFAS) exposure means avoiding products and environments contaminated with these chemicals, which can help prevent potential health issues like hormonal disruption and adverse effects on liver and immune function.

How it helps

A study of 581 newborns associated high PFOS or PFDA levels with shorter telomeres in girls [\[R\]](#).

19



Hydrogen Water

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Drink 1.5 to 2 liters of hydrogen-rich water daily, spread out over the course of the day. It is best to start with a lower volume and gradually increase it to allow your body to adjust. This practice should be continued daily as a part of your lifestyle to maintain its potential benefits.

Description

Drinking hydrogen-rich water is believed to have antioxidant properties and may help combat oxidative stress in the body. Some studies suggest it could potentially support overall health and well-being.

How it helps

Drinking hydrogen-rich water is thought to combat oxidative stress, which can damage and reduce telomere length. By fighting this oxidation, it could potentially contribute to preserving telomere length, thus keeping cells healthier and potentially slowing ageing.

In a placebo-controlled trial of 40 older adults, drinking hydrogen-rich water (0.5 L/day) for 6 months increased telomere length [\[R\]](#).

20

Avoid BPA (Bisphenol A) Exposure

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

To avoid BPA exposure, choose BPA-free products, particularly when selecting food containers, water bottles, and baby bottles. Prefer glass, porcelain, or stainless steel containers, especially for hot food or liquids. Reduce use of canned foods as they may be lined with BPA and avoid handling thermal paper receipts, as they can contain BPA. When possible, select fresh or frozen foods over canned goods.

Description

Avoiding BPA (Bisphenol A) exposure involves minimizing contact with products or containers containing this chemical, which is commonly found in plastics and can potentially disrupt hormone regulation.

BPA (bisphenol A) is a chemical used to make certain plastics and resins. BPA-containing plastics are often used in containers that store food and beverages. Plastics marked with **recycling code 3 or 7** may contain BPA [\[R\]](#).

BPA is a well-known hormone disruptor. Research has linked BPA exposure to diabetes, heart disease, altered behavior, and more [\[R\]](#).

How it helps

High BPA levels in the blood or urine may be associated with shorter telomeres, especially in women [\[R, R\]](#).

Babies born to mothers exposed to BPA may also have shorter telomeres [\[R\]](#).

If you're concerned about BPA, try following these steps to reduce your exposure [\[R, R\]](#):

- **Use BPA-free products** (more and more BPA-free plastic products are available)
- **Don't heat plastics or leave plastic bottles exposed to direct sunlight** (heat may increase BPA release)
- **Focus on fresh foods** (choose fresh food that's not packaged or canned)
- **Use plastic alternatives** (use glass, porcelain or stainless-steel containers)
- **Dust your home** (dust can be a significant source of BPA, especially for children)

21



Avoid PAHs Exposure

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Minimize your exposure to Polycyclic Aromatic Hydrocarbons (PAHs) by avoiding or reducing consumption of charred, grilled, or smoked foods, not smoking or avoiding secondhand smoke, and limiting time spent in areas with heavy traffic or industrial fumes. Use exhaust fans in kitchens and ensure proper ventilation when cooking at high temperatures to reduce indoor levels of PAHs.

Description

PAHs or Polycyclic Aromatic Hydrocarbons are harmful substances found in smoke and grilled foods. Try to limit exposure to them for better health. For example, avoid inhaling smoke from cigarettes or barbeques and choose alternative cooking techniques over grilling. Minimizing PAHs can reduce the risk of several health issues, particularly lung and skin diseases.

How it helps

A study of 1460 participants associated exposure to PAHs, as well as to 2-napthol and 2-fluorene, with decreased telomere length. For every one-unit increase in the base-10-logarithm-transformed 2-napthol and 2-fluorene concentrations, telomere length decreased by 1% [\[R\]](#).

22



Limit Coffee Intake

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Reduce your coffee consumption to no more than 2-3 cups (approximately 200-300 mg of caffeine) per day. Try to avoid drinking coffee after 2 PM to minimize potential impacts on sleep.

Description

Limiting coffee consumption can help prevent potential side effects like jitteriness, insomnia, and increased heart rate, while allowing for better sleep quality and overall energy regulation. Moderation in coffee intake supports overall well-being without overstimulation.

People often drink coffee for an energy and mood boost [\[R\]](#), [\[R\]](#).

However, **coffee also comes with some drawbacks**. Drinking a lot of coffee can increase blood pressure and anxiety. It may also cause headaches [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

Consuming excessive coffee may result in increased oxidative stress and inflammation in the body, potentially accelerating telomere shortening. Therefore, limiting coffee intake can help maintain the length of your telomeres, thus slowing cellular aging.

Observational analysis found that coffee and instant coffee intake were linked to shorter telomeres. Each additional cup of coffee equated to a 0.12-year decrease, and instant coffee to a 0.38-year decrease in telomere length. Filtered coffee showed no significant correlation. Mendelian randomization analysis supported these findings [\[R\]](#).

Please note: *Too much caffeine (over 400 mg per day) may lead to sleep problems, high blood pressure and cholesterol, fast heart rate, and dependence. If you're pregnant, try to limit caffeine to 200 mg per day* [\[R\]](#), [\[R\]](#).

Please note: *polyphenols and tannins from coffee may bind to iron and form insoluble complexes, which reduces iron absorption in the gut. If you have anemia, consult your healthcare provider before using coffee or coffee supplements.*

23

Hyperbaric Oxygen Therapy

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Schedule and attend sessions in a hyperbaric oxygen therapy chamber as your doctor prescribes, typically for about 60 to 90 minutes per session. The exact number of sessions required can vary based on the condition being treated, but it often ranges from 20 to 40 sessions, which may be conducted daily or a few times a week.

TYPICAL STARTING DOSE

90 minutes

Description

Hyperbaric oxygen therapy increases the amount of oxygen in the blood and tissues, which can help to improve circulation, reduce inflammation, and promote healing.

How it helps

In a non-placebo-controlled trial of 35 healthy volunteers, receiving hyperbaric oxygen therapy for 60 days increased telomere length and cleared senescent cells [\[R\]](#).

Please note: Hyperbaric oxygen therapy is a potentially dangerous procedure that should only be performed under medical supervision. People with pneumothorax or congestive heart failure are at especially high risk of adverse effects. Because highly concentrated oxygen can easily catch on fire, avoid potential fire sources around hyperbaric oxygen chambers, oxygen gas cylinders, tanks, and concentrators [\[R\]](#), [\[R\]](#).

24



Astragalus

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a 500 mg astragalus supplement once daily with a meal. Continue this regimen for at least 4 to 6 weeks to evaluate its effectiveness on your overall health.

TYPICAL STARTING DOSE

500 mg

Description

Astragalus is an herb used in traditional Chinese medicine. It is believed to have immune-boosting properties and may help reduce stress and support overall vitality.

[Astragalus](#) (*Astragalus membranaceus*) is an herb used in traditional Chinese medicine. It is commonly used for “tonifying Qi” or fatigue. It may help [\[R\]](#), [\[R\]](#):

- Reduce inflammation
- Fight [oxidative stress](#)

Astragalus root is a staple of traditional Chinese medicine, where it is also known as *Huang Qi*.

How it helps

An astragalus supplement (TA-65) taken for 12 months lengthened the telomeres in a placebo-controlled trial of 117 relatively healthy cytomegalovirus-positive subjects aged 53-87 years old [\[R\]](#).

Astragalus may help to support the activity of telomerase, an enzyme that aids telomere regeneration.

25



Yoga

IMPACT

0 / 5

EVIDENCE

1 / 5

How to implement

Practice yoga for at least 20 to 30 minutes a day, most days of the week. Choose a style that matches your fitness level and goals, and consider attending a class or using online resources to guide your practice.

TYPICAL STARTING DOSE

30 minutes

Description

Yoga is a mind-body practice that combines physical postures, breathing exercises, and meditation. It enhances flexibility, strength, and mental well-being and is used for stress reduction, relaxation, and overall health improvement.

[Yoga](#) combines breathing, stretching, and relaxation techniques. Practicing yoga may help [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Reduce [stress](#)
- Improve fitness
- Lower blood pressure and heart rate
- Manage pain

How it helps

Yoga interventions may boost telomerase activity and non-significantly increase telomere length [\[R\]](#), [\[R\]](#), [\[R\]](#).

26



Dietary Polyphenols

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate foods rich in dietary polyphenols into your daily diet. This can include consuming a variety of fruits like berries, apples, and grapes; vegetables such as onions and broccoli; nuts and seeds; as well as beverages like green tea and coffee. Aim for at least five servings of fruits and vegetables per day to achieve a beneficial intake of polyphenols.

Description

Polyphenols are antioxidants found in foods like fruits, vegetables, and tea, which may offer various health benefits, including reduced inflammation and improved heart health.

Polyphenols are plant components with antioxidant properties. They help reduce [oxidative stress](#) [R].

High levels of oxidative stress can damage our cells. Oxidative stress plays a role in many health conditions, including [R]:

- High blood sugar
- Type 2 diabetes
- Heart disease

You can get most polyphenols and other antioxidants from fresh fruits and vegetables [R, R].

How it helps

Polyphenols found in foods like dark chocolate, berries, and nuts have antioxidant properties that could aid in protecting telomeres from oxidative damage.

27



Mindfulness-Based Stress Reduction (MBSR)

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Enroll in an 8-week MBSR course, which includes a weekly 2.5-hour class, one all-day class after the sixth week, and 45 minutes of daily home practice guided by assignments and instructional recordings.

TYPICAL STARTING DOSE

2 hours

Description

Mindfulness-Based Stress Reduction (MBSR) is a structured program that teaches mindfulness techniques to reduce stress and improve overall mental and emotional health. MBSR has been shown to help individuals cope with chronic pain, anxiety, and other stress-related conditions.

How it helps

MBSR techniques can reduce stress and improve psychological well-being, potentially influencing the maintenance and length of telomeres.

28



Zinc

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take a 15 mg zinc supplement daily, ideally with a meal to enhance absorption.

TYPICAL STARTING DOSE

15 mg

Description

Zinc is an essential mineral found in various foods, including meat, dairy, and nuts. It is crucial for immune function, wound healing, DNA synthesis, and maintaining healthy skin and nails. Zinc supplements are sometimes used to support immune health and manage zinc deficiencies.

[Zinc](#) is an essential mineral. Your body needs it to [\[R\]](#), [\[R\]](#):

- Defend against disease
- Protect DNA from damage
- Heal wounds
- Control blood sugar

Some of the best sources of zinc include **shellfish, pork, beef, and beans**. It is also available as a supplement [\[R\]](#).

Adults should get **8-11 mg of zinc** per day [\[R\]](#).

How it helps

Essential for numerous biochemical processes, zinc may have a role in DNA synthesis and cell division, which are important for telomere health.

29



Fruits And Vegetables

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Increase your intake of fruits and vegetables to at least five servings per day, aiming for a variety of types and colors to ensure a broad range of nutrients. Each serving size should roughly be the amount you can fit in one hand. Try to incorporate at least one serving of fruits or vegetables into every meal and snack throughout the day.

Description

A diet rich in fruits and vegetables provides essential nutrients, antioxidants, and dietary fiber. This combination supports overall health, helps maintain a healthy weight, and reduces the risk of chronic diseases such as heart disease and certain cancers.

How it helps

Fruits and vegetables are high in vitamins, minerals, and fiber, which can combat oxidative stress and inflammation, potentially aiding in telomere maintenance.

30



Limit Calorie Intake

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Consume fewer calories than your body needs for maintenance. Calculate your daily caloric needs using an online calculator based on your sex, age, weight, height, and activity level, then reduce that number by 500-1000 calories per day to safely lose 1-2 pounds per week. Adjust the caloric intake as needed based on your progress.

Description

People often limit their calorie intake to help them lose weight [\[R, R\]](#). However, moderate calorie restriction may also help you stay healthier and age better [\[R, R, R, R, R\]](#).

There are different ways to take in fewer calories. You can:

- **Eat low-calorie foods**, such as those rich in proteins, fiber, and water. Avoid fatty and sugary foods, which tend to be high in calories [\[R\]](#).
- Try [intermittent fasting](#), which involves changing how often you eat [\[R\]](#).

If you are restricting your calories, make sure your diet remains healthy and balanced. Experts also recommend being physically active, to prevent the loss of muscle and bone mass.

How it helps

Calorie restriction has been associated with longer telomeres in some studies, potentially through decreased oxidative stress and metabolic strain on cells.

31



Coenzyme Q10 (CoQ10)

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take a 100 mg Coenzyme Q10 (CoQ10) supplement once daily with a meal that contains fat for better absorption.

TYPICAL STARTING DOSE

100 mg

Description

Coenzyme Q10 (CoQ10) is a naturally occurring antioxidant that plays a crucial role in cellular energy production. It is often taken as a supplement to support heart health, improve energy levels, and provide antioxidant protection, especially for individuals with certain medical conditions or as they age.

[Coenzyme Q10](#) (CoQ10) is a compound that helps enzymes work better. By doing so, CoQ10 helps improve [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Energy levels
- Antioxidant protection
- Heart health
- Muscle strength
- Blood sugar control

The amount of CoQ10 made by your body decreases as you get older. Luckily, you can also get it from food or supplements. Good sources of CoQ10 include [\[R\]](#), [\[R\]](#):

- Organ meats
- Fatty fish
- Whole grains

How it helps

Coenzyme Q10 helps in energizing cells and has antioxidant properties which remove harmful substances that damage our cells. This supplement may help slow down aging processes, including telomere shortening, which helps in treating conditions related to telomere length.

In a study of Swedish citizens aged 70-80 with low selenium levels, 42 months of selenium and coenzyme Q10 supplementation prevented telomere shortening. At baseline, telomere length did not significantly differ between the active treatment and placebo groups. However, after 42 months, the active treatment group showed less telomere shortening compared to the placebo group [\[R\]](#).

After 48 months of taking selenium yeast and coenzyme Q10 supplements, participants had increased serum R-SH (free thiols) levels compared to a placebo group (P = 0.002). Low R-SH levels at the start were linked to a higher risk of cardiovascular mortality even after adjusting for other factors (HR 1.98 per SD, 95% CI: 1.34-2.91, P < 0.001) during a 10-year follow-up [\[R\]](#).

32



Berries

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate a variety of berries such as strawberries, blueberries, raspberries, and blackberries into your daily diet. Aim for at least one cup of fresh or frozen berries every day, either as a snack, part of your breakfast (such as in oatmeal or yogurt), or as a dessert.

Description

Berries, such as strawberries, blueberries, and raspberries, are packed with antioxidants, vitamins, and fiber. Regular consumption of berries may support heart health, improve cognitive function, and contribute to overall well-being.

How it helps

Berries are rich sources of antioxidants and polyphenols that protect cells from oxidative stress, possibly helping to maintain telomere length.

33



Green Tea

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Consume 400 mg of green tea extract daily. This can be taken in the form of capsules or tablets available that specify the amount of green tea extract. Ensure the supplement is taken according to the product's specific instructions, usually once a day with water.

TYPICAL STARTING DOSE

400 mg

Description

Tea is a beverage made by steeping the leaves of the *Camellia sinensis* plant in hot water. It comes in various types, including black, green, white, and herbal teas, and is known for its diverse flavors and potential health benefits due to antioxidants and other bioactive compounds.

[Green](#) and black tea are made from the same plant (*Camellia sinensis*). This plant is processed in different ways to make each type of tea [\[R, R\]](#).

Tea contains antioxidants called **flavonoids**, which may help prevent [\[R, R, R, R\]](#):

- Heart disease
- Cancer
- Diabetes

How it helps

Green tea is abundant in catechins, a type of polyphenol, which may exert protective effects on telomeres through antioxidant properties.

34



Dietary Omega-3 Fatty Acids

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate foods high in omega-3 fatty acids into your diet daily. This includes eating fish such as salmon, mackerel, and sardines at least twice a week. Alternatively, include a tablespoon of flaxseed oil or chia seeds in your daily diet.

Description

[Omega-3 fatty acids](#) are some of the healthiest fats we can eat. They help lower inflammation and protect the heart, brain, and eyes. Our bodies produce less omega-3s than we need for optimal health, so it's important to get enough through food or supplements [\[R\]](#), [\[R\]](#), [\[R\]](#).

There are three major types of omega-3s: ALA, EPA, and DHA. **EPA and DHA are vital for mental and heart health** [\[R\]](#), [\[R\]](#), [\[R\]](#).

Fatty fish are rich in EPA and DHA. They include [\[R\]](#):

- Salmon
- Tuna
- Herring
- Sardines

For optimal health, try to get at least **two servings of fatty fish per week**. Fish oil supplements are available for those who don't eat fish regularly [\[R\]](#).

How it helps

Dietary omega-3 fatty acids have anti-inflammatory properties which might help in the preservation of telomere length.

35



Antioxidant Supplements

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take an antioxidant supplement daily with a meal to enhance absorption. The specific dose may vary depending on the type of antioxidant (e.g., vitamin C, vitamin E, selenium), but a common multivitamin or antioxidant blend can be used as directed on the product label. Consult with a healthcare provider for personalized advice and dosage.

Description

Antioxidant supplements are dietary supplements that provide concentrated doses of antioxidants, such as vitamins C and E or coenzyme Q10, to help combat oxidative stress and reduce the risk of chronic diseases.

Our cells sometimes produce molecules called **reactive oxygen species (ROS)** [\[R\]](#).

High levels of ROS can cause [oxidative stress](#) and damage our cells. Oxidative stress plays a role in many health conditions, including [\[R\]](#):

- High blood sugar
- Type 2 diabetes
- Heart disease

Antioxidants are substances that help combat ROS [\[R\]](#).

Some common antioxidants include [vitamin C](#) and [vitamin E](#). You can get most antioxidants from fresh fruits and vegetables. **Antioxidants are also available as supplements** [\[R\]](#), [\[R\]](#).

How it helps

Antioxidants can protect against oxidative stress, a factor that can accelerate telomere shortening and impact cellular aging.

36



Vitamin C

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 500-2000 mg of vitamin C supplement daily. It can be taken at any time of the day, with or without food, according to personal preference or tolerance.

TYPICAL STARTING DOSE

2000 mg

Description

[Vitamin C](#) is an essential nutrient. This means that our bodies can’t produce it on their own, so we have to get it from food or supplements [\[R\]](#).

Foods rich in Vitamin C include: [\[R\]](#)

- Citrus Fruits
- Peppers
- Brussel sprouts
- Kiwi
- Broccoli
- Tomato
- Cantaloupe
- Cauliflower
- Spinach

Vitamin C has antioxidant properties. It supports immunity, heart health, and wound healing [\[R\]](#), [\[R\]](#).

Vitamin C deficiency is called *scurvy*. In the past, many sailors suffered from it [\[R\]](#).

How it helps

Vitamin C is an antioxidant that can protect cells from free radical damage and support healthy telomeres.

37



Dietary Antioxidants

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate foods rich in antioxidants, such as fruits (berries, oranges, plums), vegetables (spinach, kale, bell peppers), nuts (walnuts, almonds), and seeds (flaxseeds, chia seeds) into your daily meals. Aim for at least 5 servings of fruits and vegetables per day, ensuring a variety of colors to cover different antioxidants.

Description

Dietary antioxidants are compounds found in foods that help neutralize harmful molecules called free radicals, potentially reducing the risk of oxidative stress-related diseases and supporting overall health. Examples include vitamins C and E, beta-carotene, and polyphenols.

Our cells sometimes produce molecules called **reactive oxygen species (ROS)** [\[R\]](#).

High levels of ROS can cause [oxidative stress](#) and damage our cells. Oxidative stress plays a role in many health conditions, including [\[R\]](#):

- High blood sugar
- Type 2 diabetes
- Heart disease

Antioxidants are substances that help combat ROS [\[R\]](#).

Antioxidants are found in many plants. Good sources include [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Fruits like tomatoes, berries, and pomegranates
- Vegetables like onions, spinach, and celery
- Chocolate
- Olive oil
- Wine

How it helps

Multiple dietary antioxidants from fruits and vegetables can protect cells from damage and support telomere integrity.

How to implement

TYPICAL STARTING DOSE

400 mcg

Description

Vitamin B9 (*folate*) plays an essential role in [R, R, R]:

- Making DNA
- Metabolism
- Energy production

SelfDecode recommends L-methylfolate as the preferred folate supplement for those who need one. It is superior to folic acid because it doesn't require activation, but the research is still ongoing [\[R, R\]](#).

How it helps

Folate supports DNA synthesis and repair; adequate levels are important for cellular health, including the preservation of telomere length.

Next Steps

Remember, your genes only tell one important part of your health story!

Now that you've seen your DNA-based results for this health topic, let's take a look at other contributing factors.

Your lab results

Your lab results are impacted by the combined effect of your genes, environment and lifestyle.

Lab tests will give you the best picture of your current health status, while your genes provide insight into your health predispositions and which recommendations are best for you.

