

Type 2 Diabetes

Disease Report

REPORT CATEGORIES —



BLOOD SUGAR
CONTROL



LONGEVITY

Sample Client

Report date: 15 January 2026

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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

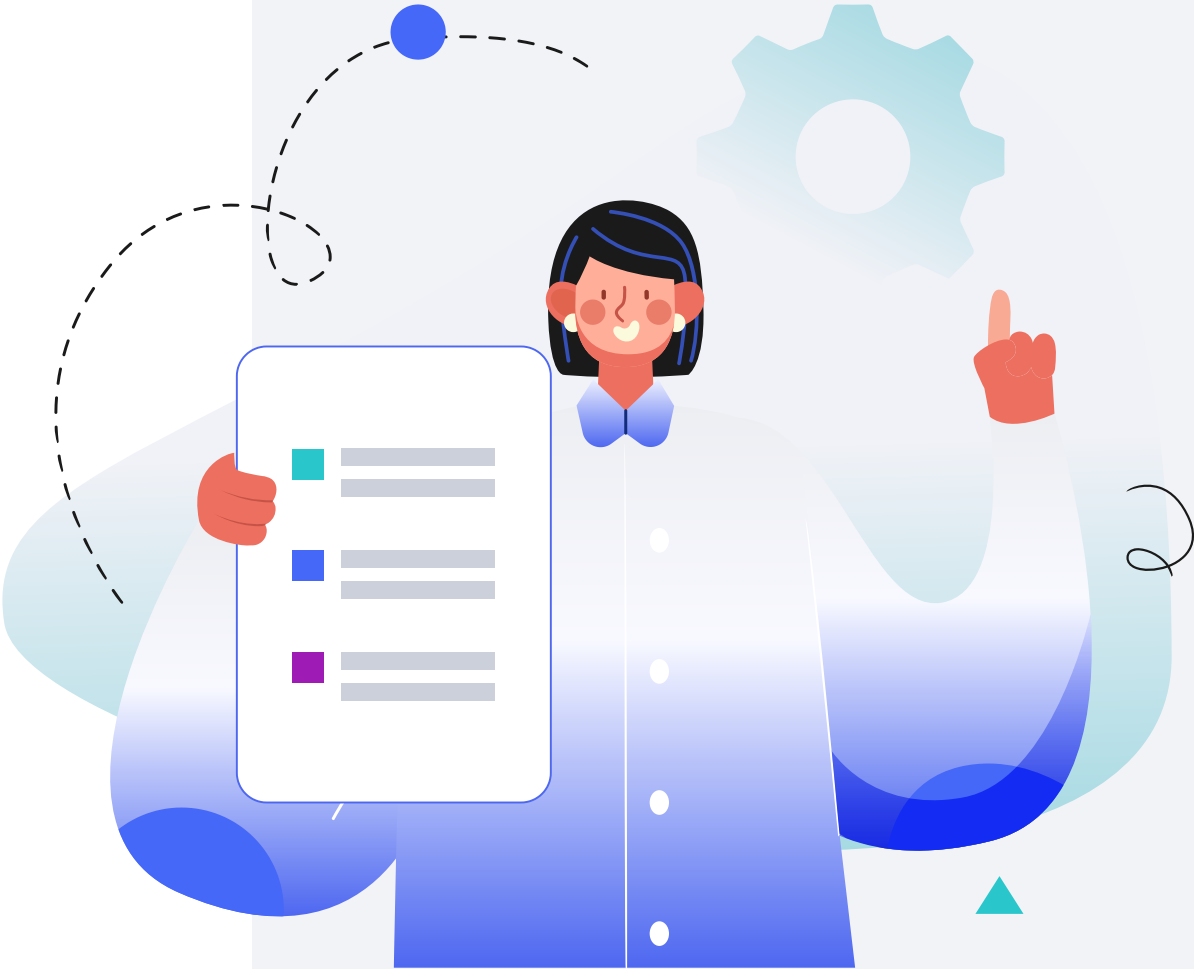
Male

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

Whole grains are loved by doctors, and it’s no wonder why. They’re a great source of fiber and can lower your risk of health problems like CVD, type 2 diabetes, and digestive issues.

Despite these benefits, some people claim the opposite: that eating whole grains is bad for their health. For a long time, this peculiar disagreement has gone unanswered.

Now, through clues hidden in our DNA, we may finally have an answer. This is all thanks to scientists who investigated the link between two variants of the *TCF7L2* gene and type 2 diabetes.

What they found was that when it comes to eating whole grains and fiber, those who carried the first variant were indeed protected from diabetes. However, those who carried the second variant were actually at a higher risk of diabetes [\[R\]](#), [\[R\]](#)!

Confusing, right? But why was this the case...?

Well, we don’t know for certain, but scientists believe it comes down to the evolutionary origin of your inherited *TCF7L2* gene variant.

We think that the first variant they tested likely evolved over the last 12,000 years as we transitioned to farming. Farmed foods like grains are typically higher in sugar, and this genetic variant may help us to better digest these.

On the other hand, the second variant is believed to stem back to our ancient hunter-gatherer ancestors, who used to roam far and wide foraging for food like berries and wild animals. Compared to us today, these people would have rarely needed to digest complex carbohydrates.

Despite high fiber foods like whole grains containing less sugar, they can still cause a blood sugar spike in those with hunter-gatherer DNA, because these individuals aren’t as well equipped to digest these foods [\[R\]](#).

That’s where this report comes in. Here, you can identify whether you have the “hunter-gatherer” or “farmer” genetic variants. You can then take action — for example, if you happen to have hunter-gatherer DNA, maybe you eat less starch and eat more resistant starch instead.

Why? Because resistant starch can’t be digested. This means that it doesn’t cause the same blood sugar spikes typical starches do. Better yet, because resistant starch remains undigested, it passes through to our gut where it helps to feed our friendly bacteria, which provide [a host of health benefits](#). These benefits make resistant starch much more suited to those with hunter-gatherer genes [\[R\]](#), [\[R\]](#), [\[R\]](#).

That’s why it’s essential to know how your genes affect your blood sugar! Your DNA can help predict which strategies may work best for you, helping you to live a healthier and happier life.

This report focuses on the genetics of blood sugar. Read more to find out:

- **How your genetics play a role in high blood sugar**
- **Your genetic risk score based on over one million genetic variants**
- **Personalized recommendations based on your genetics**

Longevity Screener

Longevity Screener analyzes your DNA and biometric data to holistically determine your risk of developing serious medical conditions.

✓

Your lifetime risk is **Normal**

✓

Your 10-year risk is **Normal**

Summary or results

Your results are indicating a Normal risk of developing Type 2 Diabetes in your lifetime and within the next decade.

Monitor your risk by regularly checking your related labs and implementing the recommendations provided.

The risk of developing Type 2 diabetes can be influenced by non-genetic factors such as elevated BMI.

What to do if you get a High risk

Analyze your labs

Analyze your lab results to establish a baseline and track any changes or improvements in your health markers over time.

Find out your out-of-optimal labs

We will pinpoint any values that fall outside the optimal range, allowing you to focus on what matters most.

Optimize labs

Aim to bring all your lab results to optimal levels through lifestyle changes, treatments, and ongoing monitoring for the best health outcomes.

Disclaimer

The Longevity Screener feature is designed to provide insights based on genetic predispositions and basic health data to help you understand factors that may influence your longevity. This tool is for informational purposes only and does not constitute medical advice, diagnosis, or treatment. Always consult with a qualified healthcare provider before making any decisions related to your health, lifestyle, or medical treatments. The information provided by the Longevity Screener is based on current scientific research and should be used as a supplementary tool in conjunction with professional medical advice.

About Type 2 Diabetes

Key Takeaways:

- Almost **1 in 3 Americans** are at risk of developing type 2 diabetes.
- Up to **80%** of the differences in people's risk for getting type 2 diabetes may be due to genetics.
- Even with high genetic risk, blood sugar issues are highly modifiable through diet, exercise, and lifestyle changes.
- Risk factors include: obesity, high sugar diet, lack of exercise, age over 45, smoking, and family history. Even with low genetic risk, these factors can raise your overall risk, so take action now!
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

You've probably heard about the dangers of high [blood sugar](#) (glucose). It puts **almost 1 in 3 Americans at risk of developing type 2 diabetes** [\[R\]](#).

Type 2 diabetes is a common and dangerous disease. In older adults, it can cause heart disease, stroke, kidney damage, and more. If diabetes isn't treated, it can be fatal [\[R\]](#).

If you're at risk of diabetes, your doctor may recommend weight loss and diet changes. **Eating less sugar is usually the first step.** If your [blood sugar](#) (glucose) is very high, your doctor may also prescribe medications [\[R\]](#), [\[R\]](#).

To understand how blood sugar rises and falls, we first need to understand how insulin works.

When blood sugar is high, the pancreas releases [insulin](#). Insulin is responsible for lowering blood sugar. It signals your liver and muscles to store sugar [\[R\]](#), [\[R\]](#).

Insulin levels rise when you eat sugary foods. If insulin stays high for a long time, your body can stop responding



TYPICAL LIKELIHOOD

Typical likelihood of type 2 diabetes based on 1,048,858 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
TCF7L2	rs7903146	CT
SLC30A8	rs13266634	CC
GCKR	rs780093	CC
CDKN2A	rs10811661	TT
ADCY5	rs11708067	AA
BCL2	rs12454712	TT
HMGA2	rs2261181	TC
IMPDH1	rs791595	AG
TNF	rs2857605	TC
SLC38A11	rs10195252	TC
TSPAN3	rs7177055	GA
DGKB	rs2191349	GT
IGF2BP2	rs1470579	AC
CCND2	rs76895963	TT
TCF7L2	rs4506565	AT
PEMT	rs12325817	CC
WSB2	rs7973260	AG
IGF2BP2	rs11927381	TC
IGF2BP2	rs11705701	GA
MC4R	rs12970134	GG
JAZF1	rs1635852	CC
TAP2	rs2071479	CC
GIPR	rs10423928	TT
KCNJ11	rs5215	TT

to it. This is called [insulin resistance](#) [R].

Insulin resistance often leads to higher than normal blood sugar levels, or *prediabetes*. **If you don't take steps to fix it, prediabetes can develop into type 2 diabetes** [R].

Prediabetes is hard to spot because it doesn't have obvious symptoms. However, blood tests can help diagnose it [R].

A doctor might order [blood sugar tests](#) if any of the following risk factors apply to you [R]:

- Obesity
- A diet high in sugar and refined carbs
- Lack of exercise
- Age over 45
- Polycystic ovary syndrome (PCOS)
- Smoking
- Family history of diabetes
- Black, Hispanic, Asian, or Native American ethnicity

Up to 80% of the differences in people's chances of getting type 2 diabetes can be attributed to genetics.

Genes that may contribute to high blood sugar influence [R]:

- Sensitivity to insulin ([TCF7L2](#), [FTO](#), [PPARG](#))
- Insulin production & release ([KCNJ11](#), [SLC30A8](#))
- Liver function ([HNF4A](#))

Genetically high levels of the following markers may be causally associated with a higher risk of type 2 diabetes [R, R, R, R, R]:

- IGF-1
- Neutrophils
- Leucine

In contrast, genetic predisposition to the following high markers may be causally linked to a lower risk of type 2 diabetes [R, R, R, R, R, R]:

- Testosterone (in men)
- Betaine
- Choline
- Alpha-linolenic acid

GENE	SNP	GENOTYPE
CDKAL1	rs7756992	AA
/	rs184660829	TT
/	rs569511541	AA
/	rs555402748	CC
/	rs562386202	AA
/	rs543786825	CC
/	rs759111467	GG
CCDC68	rs76197067	AA
RNASEH2A	rs755734872	CC
NEDD1	rs557027608	GG
/	rs533172266	CC
CDKAL1	rs9465871	TT
QSER1	rs528122639	GG
BPTF	rs558308082	GG
ZC3H11B	rs553014999	TT
ABCC8	rs67254669	AA
INS	rs571342427	TT
FAM13A	rs576406049	CC
/	rs745903616	GG
FTO	rs9939609	TT

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	Avoid Sugary Foods & Drinks	2	Exercise At Least One Hour a Day1 hour
3	Aerobic Exercise (Cardio)1 hour	4	Berberine500 mg
5	Strength Training1 hour	6	Limit Calorie Intake
7	Resistant Starch40 g Hi-Maize	8	Mediterranean Diet
9	Psyllium5 g	10	Methylfolate400 mcg
11	Green Tea400 mg	12	Zinc10 mg
13	Chickpeas	14	Low-Carbohydrate Diet
15	Avoid Organochlorine Pesticide Exposure	16	Eat Fiber-Rich Foods
17	Whole Grains	18	Chia Seeds
19	Hazelnuts	20	Inulin5 g
21	Sleep for 7+ Hours	22	Tai Chi1 hour
23	Cinnamon500 mg	24	Beta-Glucans
25	Black Seed Oil2 tsp	26	Green Coffee Extract400 mg
27	Fenugreek500 mg	28	Stinging Nettle300 mg
29	Avoid PAHs Exposure	30	Alpha-Lipoic Acid100 mg
31	Glucomannan3 g	32	Black Seed (Black Cumin)1000 mg

33	Whey Protein	25 g	34	Avoid PCBs	
35	Avoid Phthalate Exposure		36	Ginger	500 mg
37	Flaxseed	2 tbsp	38	Paleo Diet	
39	Garlic		40	Legumes	
41	Moringa	400 mg	42	Tart Cherries	
43	Myo-inositol	4 g	44	Relaxation Techniques	30 minutes
45	Keto Diet		46	Practice Exercise Snacks	1 minutesute
47	Soy Protein	20 g	48	White Mulberry	
49	Pistachios		50	Milk Thistle (Silymarin)	300 mg
51	Inositol	2 g	52	Brown rice	
53	Aquatic Exercise	1 hour	54	Yoga	30 minutes
55	Ginkgo	120 mg	56	Vitamin C	500 mg
57	Magnesium	250 mg	58	Betaine (TMG)	500 mg
59	Probiotics	10 billion	60	Apple Cider Vinegar	
61	Vinegar		62	Vanadium	
63	Banaba	32 mg	64	Broccoli	
65	Avoid Air Pollution		66	Aloe Vera	50 mg
67	Intermittent Fasting		68	Spirulina	500 mg
69	Resveratrol	150 mg	70	Chromium	200 mcg
71	Coenzyme Q10 (CoQ10)	100 mg	72	Genistein	30 mg

73	Walking	30 minutes
74	Avoid Arsenic Exposure	
75	Brewer's Yeast	
76	Green Tea Extract	250 mg
77	Decaffeinated Coffee	
78	Avoid Pesticide Exposure	
79	Curcumin	500 mg
80	Oats	
81	Drink at Least 8 Glasses of Water a Day	
82	Extra Virgin Olive Oil (EVOO)	
83	Cocoa	
84	Bilberry	
85	Maintain Optimal Vitamin D Levels	1000 iu
86	L-Carnitine	500 mg
87	Barberry	500 mg
88	Avoid Noise Pollution	
89	Cardamom	500 mg
90	Soy Isoflavones	40 mg
91	Sesame Oil	
92	Pycnogenol	100 mg
93	Glutamine	5 g
94	Apples and Pears	
95	Ivy Gourd Extract	300 mg
96	Dietary Pentadecanoic Acid	
97	Honey	
98	American Ginseng	200 mg
99	Mindfulness-Based Stress Reduction (MBSR)	2 hours
100	Jiaogulan (Gynostemma Pentaphyllum)	1350 mg
101	Breathing Techniques	10 minutes
102	Histidine	500 mg
103	Tocotrienols	100 mg
104	Mindfulness-Based Cognitive Therapy (MBCT)	2 hours
105	Trehalose	1000 mg
106	Propolis	
107	Mindfulness Meditation	30 minutes
108	African Mango Seed Extract	300 mg
109	Biotin And Chromium Picolinate	
110	Lactobacillus Plantarum	10 billion CFU
111	Jujube	250 mg
112	Gymnema	200 mg

113	Papaya	500 mg	114	Salacia Extract	240 mg
115	Magnesium Chloride	200 mg	116	Avoid Perchlorate	
117	Whole-Body Vibration	15 minutes	118	Astaxanthin	12 mg
119	Poria		120	Green Peas	
121	Oyster Mushroom	600 mg	122	Yacon	
123	Creatine	2 g	124	Fruits	
125	Broccoli Sprouts	2 tbsp	126	Allulose	30 g
127	Astragalus	500 mg	128	Bitter Melon Supplement	500 mg
129	Pilates	30 minutes	130	Kimchi	
131	Quinoa		132	Sweet Potatoes	
133	Probiotic Yogurt		134	Prickly Pear (Nopal Cactus) Extract	500 mg
135	Cruciferous Vegetables		136	Leafy Green Vegetables	
137	Tomato		138	Pumpkin Seeds	
139	Vitamin K1	90 mcg	140	Dietary Vitamin K1	
141	Pears		142	Avoid Cadmium Exposure	
143	Hibiscus	250 mg	144	Avoid BPA (Bisphenol A) Exposure	
145	Limit Cantaloupe		146	Stevia	
147	Cumin	500 mg	148	Cranberry	
149	Taurine	500 mg	150	Avoid Exposure to Heavy Metals	
151	Berries		152	Avoid Secondhand Smoke	

153	Avoid PFAS Exposure		154	Raisins	
155	Guarumo (Trumpet)		156	Ecklonia Cava	100 mg
157	Safflower Oil		158	Meditation	30 minutes
159	Kelp	500 mg	160	Red Clover	40 mg
161	Caper Fruit Extract	400 mg	162	Iyengar Yoga	1 hour
163	Bilberry Extract		164	Prickly Pear (Nopal Cactus)	
165	Buckwheat		166	Walking Meditation	30 minutes
167	Apples		168	Carnosine	1000 mg
169	Bay Leaf		170	Nectarines	250 mg
171	Choline Supplements	425 mg	172	Avoid Long Naps	
173	Infrared Light Therapy		174	Beta-Alanine	2 g
175	Bergamot		176	Yoga Nidra	30 minutes
177	Skullcap	1 g	178	Neem	300 mg
179	Dietary Vitamin E		180	Mustard	
181	Lactobacillus Rhamnosus	10 billion CFU	182	Eriocitrin	500 mg
183	Horsetail	300 mg	184	Colostrum	20 g
185	Corosolic Acid	10 mg	186	Ashwagandha	120 mg
187	Saffron	20 mg	188	Tribulus	250 mg
189	Olive Leaf Extract	500 mg	190	Glycine	3 g
191	Ubiquinol	100 mg	192	Garlic Supplement	200 mg

193	Hydrogen Water		194	Jackfruit	
195	Nicotinamide Mononucleotide (NMN)	250 mg	196	Avoid Aflatoxins	
197	Hyperbaric Oxygen Therapy	90 minutes	198	Holy Basil (Tulsi)	300 mg
199	Diaphragmatic Breathing	10 minutes	200	Wakame	3 g
201	Goji LBP (Lycium Barbarum Polysaccharides)	120 mg	202	Celery Leaf Extract	500 mg
203	Okra		204	Collagen Peptides	10 g
205	Blackcurrants		206	Avoid Mycotoxin	
207	Bifidobacterium Animalis Subsp. Lactis	10 billion CFU	208	Blackcurrant Juice	
209	Onion		210	Black Chokeberry	
211	Chicory		212	Blueberries	
213	Dragon Fruit		214	Guava	
215	Fasting Mimicking Diet		216	Butyrate	300 mg
217	Bacillus Clausii		218	Brown Seaweed	500 mg
219	Blackcurrant Supplement		220	Baicalin	50 mg
221	Boswellia	350 mg	222	Yerba Mate	1 g
223	Lactobacillus Casei	10 billion CFU	224	Sage Extract	300 mg
225	Chamomile	300 mg	226	L-Citrulline	3 g
227	Brazil Nuts		228	Tea	
229	Carnivore Diet		230	Biotin	30 mcg
231	Plasmalogens		232	Avoid L-Lysine Supplements	

233	Dietary Vitamin A		234	Geranylgeraniol	150 mg
235	Oxaloacetate		236	Limit Copper Intake	
237	Avoid Selenium Supplements		238	Avoid Iron Supplements (Unless Deficient)	
239	Avoid Alanine Supplements		240	Agmatine	1 g
241	R-Alpha-Lipoic Acid	100 mg	242	L-Tyrosine	500 mg
243	Limit Salt Intake		244	Calcium Supplements	1000 mg
245	Grounding (Earthing)	30 minutes	246	Avoid BCAA Supplements	

1



Avoid Sugary Foods & Drinks

IMPACT

5 / 5

EVIDENCE

5 / 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

Sugary foods can spike your blood sugar and insulin. **Over time, this can lead to [insulin resistance](#) and increase the risk of type 2 diabetes** [\[R\]](#), [\[R\]](#), [\[R\]](#).

All health experts recommend avoiding sugary foods to people at risk of diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#).

Diets that limit sugary foods and help lower blood sugar include:

- The [Mediterranean diet](#) [\[R\]](#), [\[R\]](#), [\[R\]](#)
- The [keto diet](#) [\[R\]](#), [\[R\]](#)
- The paleo diet [\[R\]](#), [\[R\]](#)

2



Exercise At Least One Hour a Day

IMPACT

5 / 5

EVIDENCE

5 / 5

How to implement

Dedicate a minimum of 60 minutes to moderate-intensity activities such as brisk walking, swimming, or cycling. Do this most days of the week, aiming for at least 5 days to optimize benefits.

TYPICAL STARTING DOSE

1 hour

Description

[Exercise](#) can do wonders for your health. It can help you lose weight, improve your heart health, boost your mood, and more [\[R\]](#).

There are many ways you can be active. You can walk, run, swim, dance, or play team sports. **Everything counts, and it's never too late to start!**

Try to get at least **60 minutes of moderate physical activity on most days**, including walking. **Getting a mix of cardio (min 150 min/day) and strength training (min 2 times a week) may be optimal.**

How it helps

Exercise is a great way to control blood sugar levels. When you exercise, your muscles use up sugar for energy. Exercise also makes your cells more sensitive to insulin [\[R, R, R, R, R\]](#).

Try a mix of cardio and strength training for at least 150 min/week [\[R, R, R\]](#).

All health experts recommend exercise to reduce blood sugar levels. However, you may need to combine it with diet for optimal results [\[R, R, R, R, R\]](#).

 PERSONALIZED TO YOUR GENES

Exercise may lower blood sugar more in people with your [LEPR](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
LEPR	rs1137100	AG	

3



Aerobic Exercise (Cardio)

IMPACT

4 / 5

EVIDENCE

5 / 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

Exercise is a great way to control blood sugar levels. When you exercise, your muscles use up sugar for energy. Exercise also makes your cells more sensitive to insulin [\[R, R, R, R, R\]](#).

Try a mix of cardio and strength training for at least 150 min/week, which may be more effective than either of them alone [\[R, R, R\]](#).

All health experts recommend exercise to reduce blood sugar levels. However, you may need to combine it with diet for optimal results [\[R, R, R, R, R\]](#).

4



Berberine

IMPACT4 / 5

EVIDENCE5 / 5

How to implement

Take 500 mg of berberine two times a day before meals. Continue this regimen for up to three months, then evaluate its effects with your healthcare provider.

TYPICAL STARTING DOSE

500 mg

Description

Berberine is a compound found in certain plants, known for its potential to support blood sugar control and heart health.

[Berberine](#) is an active compound of some plants used in traditional medicine, such as [\[R\]](#):

- European barberry
- Oregon grape
- Goldenseal
- Chinese goldthread
- Tree turmeric

Berberine is also available as a supplement. People use it to help with [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Diabetes
- High cholesterol
- High blood pressure
- PCOS

How it helps

Berberine (0.5-1.5 g/day for 2-6 months) may help control blood sugar. It likely boosts sensitivity to insulin and lowers inflammation [\[R\]](#), [\[R\]](#), [\[R\]](#).

The combination of berberine and [milk thistle](#) may provide similar benefits [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).



PERSONALIZED TO YOUR GENES

The [PPARG](#) gene codes for [PPAR-gamma](#) 1 and 2, proteins that control [sugar](#) and fat metabolism. Excess PPAR-gamma2 activity in fat cells may lead to an accumulation of fatty acids, potentially contributing to [insulin resistance](#) and elevated blood sugar [[R](#), [R](#), [R](#), [R](#)].

Your genotype for [rs1801282](#) has been associated with relatively higher blood sugar levels and type 2 diabetes rates. It may increase PPAR-gamma2 activity in fat tissue [[R](#), [R](#), [R](#), [R](#)].

[Berberine](#) may counteract your variant by reducing PPAR-gamma2 activity in fat cells [[R](#), [R](#), [R](#), [R](#)].

>>> *To learn more about the link between the PPARG gene and blood sugar, check out the full SelfDecode blog post [here](#).*

The [LEP](#) gene helps make [leptin](#), a key hormone in appetite and metabolism control. Leptin improves insulin sensitivity and helps reduce blood sugar levels [[R](#), [R](#), [R](#), [R](#)].

Your genotype for [rs791595](#) may contribute to [leptin resistance](#). It's been associated with increased [blood sugar](#) levels [[R](#), [R](#)].

In one clinical trial, [berberine](#) supplementation reduced leptin resistance [[R](#), [R](#)].

>>> *To learn more about the link between the LEP gene and blood sugar, check out the full SelfDecode blog post [here](#).*

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
PPARG	rs1801282	CC	

GENE	SNP	GENOTYPE	EVIDENCE
IMPDH1	rs791595	AG	

5



Strength Training

IMPACT4 / 5

EVIDENCE5 / 5

How to implement

Engage in strength training exercises, such as weight lifting or bodyweight exercises, for 60 minutes per session, 2 to 3 times per week. Ensure you work all major muscle groups and rest each muscle group for at least 48 hours before exercising it again.

TYPICAL STARTING DOSE

1 hour

Description

Strength training, also called resistance or *anaerobic* training, contracts the muscles against an external resistance for short periods of time. This helps gain muscle strength, tone, and mass. This can include activities like weight lifting, pushups, and crunches.

Strength training, also known as resistance training, is a type of physical exercise that uses resistance to build strength, anaerobic endurance, and size [R]. Some of the most common strength training methods include [R]:

- Weight lifting
- Bodyweight exercises like push-ups, pull-ups, squats, and lunges.
- Resistance bands
- Plyometrics or explosive force exercises

The benefits of strength training are numerous, and include [R]:

- Increased muscle strength
- Improved bone health
- Reduced risk of injury
- Improved balance and coordination
- Enhanced mood
- Boost metabolism

Consult with a doctor before starting any new exercise program, especially if you have any health conditions.

How it helps

Exercise is a great way to control blood sugar levels. When you exercise, your muscles use up sugar for energy. Exercise also makes your cells more sensitive to insulin [R, R, R, R, R].

Try a mix of cardio and strength training for at least 150 min/week, which may be more effective than either of them alone [R, R, R].

All health experts recommend exercise to reduce blood sugar levels. However, you may need to combine it with diet for optimal results [R, R, R, R, R].

6

Limit Calorie Intake

IMPACT4 / 5

EVIDENCE5 / 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

A meta-analysis of 43 studies and 2,094 participants found that calorie restriction reduced fasting insulin and insulin resistance in both healthy and diabetic people [R].

Eating a low-calorie diet is a good way to lose weight. **It may also lower blood sugar, especially in overweight people** [R, R, R, R].

PERSONALIZED TO YOUR GENES

The [PPARG](#) gene codes for [PPAR-gamma](#) 1 and 2, proteins that control [sugar](#) and fat metabolism. Excess PPAR-gamma2 activity in fat cells may lead to an accumulation of fatty acids, potentially contributing to [insulin resistance](#) and elevated blood sugar [R, R, R, R].

Your genotype for [rs1801282](#) has been associated with relatively higher blood sugar levels and type 2 diabetes rates. It may increase PPAR-gamma2 activity in fat tissue [R, R, R, R].

Fasting and calorie restriction may counteract your variant by reducing PPAR-gamma2 activity in fat cells [R, R, R].

>>> To learn more about the link between the *PPARG* gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
PPARG	rs1801282	CC	

7



Resistant Starch

IMPACT4 / 5

EVIDENCE4 / 5

How to implement

Incorporate 40g of Jo's resistant starch into your daily diet. This can be done by adding it to smoothies, yogurt, or baked goods. Ensure to spread the intake throughout the day for better tolerance.

TYPICAL STARTING DOSE

40 g Hi-Maize

Description

Resistant starch is a type of starch that resists digestion in the small intestine, making it a prebiotic fiber that can benefit gut health. It can be found in foods like green bananas, legumes, and certain grains.

[Resistant starch](#) is starch that doesn't get digested in the small intestine [\[R\]](#) [\[R\]](#).

Some types of resistant starch include [\[R\]](#):

- **Type 1** occurs naturally in foods such as whole grains
- **Type 2** can be isolated from foods such as corn and green banana
- **Type 3** is created during the cooking and cooling process of starchy foods like potatoes

Resistant starch doesn't increase blood sugar like typical digestible starches do [\[R\]](#) [\[R\]](#).

Instead, it feeds good bacteria in the colon that [\[R\]](#) [\[R\]](#):

- Support healthy gut function
- Support immunity
- Reduce inflammation

How it helps

Resistant starch supplements (10-30 g/day) may help reduce blood sugar and prevent diabetes [\[R\]](#) [\[R\]](#) [\[R\]](#).

Resistant starch **delays the absorption of sugar**, which prevents blood sugar spikes. It may even boost your response to insulin [\[R\]](#).



PERSONALIZED TO YOUR GENES

The [BCL2](#) gene helps make a protein that controls cell death. It may improve blood sugar control by preventing [insulin resistance](#) and the death of pancreatic cells [[R](#), [R](#)].

Your genotype for [rs12454712](#) may reduce BCL2 activity. It’s been associated with higher [blood sugar](#) levels [[R](#)].

[Resistant starch](#) enhanced BCL2 activity in test tubes [[R](#), [R](#)].

>>> *To learn more about the link between the BCL2 gene and blood sugar, check out the full SelfDecode blog post [here](#).*

You carry the "hunter-gatherer" variant of the [TCF7L2](#) gene. People with your *TCF7L2* gene variant don't seem to handle carbs well. You may need to limit even high-fiber carbs like whole grains, which are protective against diabetes in other people [[R](#), [R](#), [R](#), [R](#)].

To reap the benefits of fiber for blood sugar, try supplementing with resistant starch instead.

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
BCL2	rs12454712	TT	

GENE	SNP	GENOTYPE	EVIDENCE
TCF7L2	rs7903146	CT	

8



Mediterranean Diet

IMPACT

4 / 5

EVIDENCE

4 / 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

The **Mediterranean diet may lower blood sugar levels in the long run**. It’s rich in foods that help reduce inflammation and insulin resistance [\[R, R, R, R, R, R\]](#).

People who stick to the Mediterranean diet may thus be less likely to have diabetes. Studies suggest this type of diet may be the best choice for people at risk of diabetes [\[R, R, R, R\]](#).

The Mediterranean diet is rich in [olive oil](#). **Eating olive oil may lower blood sugar levels and reduce the risk of diabetes** [\[R\]](#).

 PERSONALIZED TO YOUR GENES

The [TNF](#) gene helps make [TNF-alpha](#), a key inflammatory protein. Increased blood levels of TNF-alpha are closely linked to [insulin resistance](#) and may even directly increase blood sugar [\[R, R, R\]](#).

Your genotype for [rs2857605](#) has been associated with increased [blood sugar](#). It may increase TNF-alpha production, leading to insulin resistance [\[R, R\]](#).

[Olive oil](#) consumption may reduce TNF-alpha levels after meals. Including olive oil in the diet may reduce the odds of type 2 diabetes by up to 16%. Experts recommend the Mediterranean diet, which uses olive oil as its main source of fat, to improve blood sugar control [\[R, R, R\]](#).

>>> To learn more about the link between the TNF gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TNF	rs2857605	TC	

9



Psyllium

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

Take 5 grams of psyllium husk powder with at least 8 ounces of water. Do this once daily, preferably in the morning before breakfast. Continue this regimen daily for ongoing digestive health benefits.

TYPICAL STARTING DOSE

5 g

Description

Psyllium is a plant-based dietary fiber derived from the seeds of the *Plantago ovata* plant. It is primarily used both traditionally and today, as a dietary supplement due to its high soluble fiber content, aiding in digestive health and regulating bowel movements. The main compounds in psyllium are soluble fiber and mucilage.

[Psyllium husk](#) might be beneficial for gut health and heart health. But what exactly is this supplement and how does it work?

Psyllium is an herb that grows around the world. Its “husk,” the outer coating of the psyllium seed, is full of fiber. The health benefits of psyllium husk are due to this fiber.

How it helps

In multiple clinical trials of 12 healthy volunteers and 228 people with type 2 diabetes, psyllium husk (8-15 g/day) consumed with meals for up to 8 weeks significantly reduced both fasting and after-meal blood sugar levels, insulin spikes, and HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

A meta-analysis of 7 studies concluded that psyllium husk (10.2-13.6 g/day) given 20-30 minutes before a meal may reduce blood glucose and HbA1c levels [\[R\]](#).

Two more recent meta-analyses (one of them including 35 trials) confirmed the effectiveness of psyllium at lowering fasting blood glucose and HbA1c in people with prediabetes and type 2 diabetes, especially in those being treated for type 2 diabetes [\[R\]](#), [\[R\]](#).

In a placebo-controlled trial of 49 people with type 2 diabetes, psyllium husk (10.2 g/day) not only improved fasting blood sugar and HbA1c levels but also enhanced patient tolerance to the antidiabetic drug metformin [\[R\]](#).

Psyllium may help through its high content of soluble fiber.

10



Methylfolate

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

Take an L-methyl folate supplement (400-800 micrograms daily), ideally with a meal, to improve absorption. This dosage is recommended for adults, including pregnant women, to support overall health, especially to reduce the risk of neural tube defects in developing fetuses. Continue daily use as part of your regular supplement routine.

TYPICAL STARTING DOSE

400 mcg

Description

Folate, a B-vitamin, is crucial for DNA synthesis, cell growth, and the formation of red blood cells. Adequate folate intake supports overall health and reduces the risk of neural tube defects during pregnancy.

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

Three meta-analyses (the largest one with 29 trials and 22,250 participants) concluded that supplementation with folate (typically, 0.8-10 mg/day for 4-12 weeks) lowers fasting glucose (by 0.15 mmol/L or 2.17 mg/dL), HOMA-IR (by 0.40-0.83 units), and fasting insulin (by 1.94 µIU/mL or 1.63-13.47 pmol/L), but not HbA1c [\[R\]](#), [\[R\]](#), [\[R\]](#).

A meta-analysis of 16 studies and 763 patients with metabolic diseases found that folate supplementation lowers insulin and HOMA-IR but not fasting glucose or HbA1c [\[R\]](#).

11



Green Tea

IMPACT

4 / 5

EVIDENCE

3 / 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

A meta-analysis of 7 studies and almost 287k healthy participants associated drinking green tea with an 18% lower incidence of type 2 diabetes [\[R\]](#).

Its potential to improve blood sugar control in people with type 2 diabetes or at risk of developing this condition is less clear. While 2 meta-analyses (the largest one with 22 trials and 1,584 participants) found it effective at lowering fasting blood glucose (one of them found that high doses also lowered fasting insulin), a third meta-analysis (7 trials and 510 participants) found green tea ineffective at lowering type 2 diabetes markers in people at risk [\[R\]](#), [\[R\]](#), [\[R\]](#).

Polyphenols in green tea may improve blood sugar control.

Please note: polyphenols from green tea 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 green tea [\[R\]](#).

 PERSONALIZED TO YOUR GENES

High green tea consumption may reduce the risk of complications in people with type 2 diabetes carrying your [SOD2](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
SOD2	rs4880	GG	

12



Zinc

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

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

TYPICAL STARTING DOSE

10 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

In some people, the pancreas produces too much insulin, which can lead to insulin resistance. **Zinc may be able to prevent this and protect the pancreas from damage** [\[R\]](#), [\[R\]](#).

Zinc-deficient people are more likely to have high blood sugar [\[R\]](#).

Supplementing with zinc (25-34 mg/day) may reduce blood sugar. It may also lower the odds of type 2 diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).



PERSONALIZED TO YOUR GENES

[HLA-C](#) and other *HLA* genes help make immune proteins involved in various autoimmune conditions, including type 1 diabetes. According to limited research, HLA-associated inflammation may impair [blood sugar](#) control [\[R, R, R\]](#).

Your genotype for [rs2844623](#) ('CC'; *homozygous major*) has been correlated with higher blood sugar levels — possibly due to increased HLA activity [\[R\]](#).

[Zinc](#) deficiency can worsen inflammation by stimulating HLA proteins [\[R, R, R\]](#).

>>> *To learn more about the link between the HLA genes and blood sugar, check out the full SelfDecode blog post [here](#).*
The [SLC30A8](#) gene helps make a protein (ZnT8) that transports and removes zinc from the bloodstream. Zinc may help reduce blood sugar levels and prevent diabetes [\[R, R, R, R\]](#).

Your genotype for [rs3802177](#) has been associated with relatively higher [blood sugar](#) levels. It may increase ZnT8 activity, leading to lower blood zinc levels [\[R, R, R\]](#).

People with this variant should make sure to get enough [zinc](#) [\[R, R, R\]](#).

>>> *To learn more about the link between the SLC30A8 gene and blood sugar, check out the full SelfDecode blog post [here](#).*
Your [SLC30A8](#) gene variant is linked to high blood sugar. People with this variant may benefit more from increasing zinc intake [\[R, R\]](#). Get more zinc from zinc-rich foods or supplements.

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
HLA-C	rs2844623	CC	
SLC30A8	rs3802177	GG	
SLC30A8	rs11558471	AA	

13



Chickpeas

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

Incorporate chickpeas into your diet by adding them to salads, soups, and stews, or by making hummus. Aim for at least a half-cup serving, 3-4 times a week.

Description

Chickpeas, also known as garbanzo beans, are a good source of fiber, protein, and various vitamins and minerals. They can promote digestive regularity, provide sustained energy, and contribute to overall well-being when included in a balanced diet.

Chickpeas are a good source of minerals like manganese, iron, copper, zinc, and phosphorus, as well as folate and fiber. A ½ cup serving provides 0.9 mg of manganese or 39%DV.

How it helps

In multiple non-placebo-controlled trials involving healthy individuals, chickpea consumption or chickpea-enriched products consistently showed benefits in glycemic control. This included reduced postprandial glucose levels, improved insulin responses, and lowered insulin resistance [[R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#)].

Chickpeas are high in fiber and protein, which slow the digestion process and prevent spikes in blood sugar levels.

14



Low-Carbohydrate Diet

IMPACT

3 / 5

EVIDENCE

5 / 5

How to implement

Limit your daily intake of carbohydrates to less than 26% of your total daily calories. For a standard 2000-calorie diet, this means consuming no more than 130 grams of carbohydrates per day. Focus on including non-starchy vegetables, lean proteins, and healthy fats in your meals while minimizing the intake of sugars, bread, pasta, and other high-carb foods.

Description

Low-carbohydrate diets can promote weight loss, improve blood sugar control, and support heart health. They may also be beneficial for individuals with certain medical conditions, such as epilepsy or metabolic syndrome.

How it helps

A meta-analysis of 18 studies found that carbohydrate intake within the recommended 45–65% of calorie intake doesn’t affect type 2 diabetes risk, but intakes above 70% of calories increase the risk by 18% [\[R\]](#).

In the case of metabolic syndrome, the highest vs the lowest category of carbohydrate intake increases the risk by 25% according to a meta-analysis of 14 studies [\[R\]](#).

Nine meta-analyses concluded that carbohydrate-restricted diets (50-130 g/day for 3-12 months) reduce HbA1c (by 1-6.7 mmol/L or 0.17-0.49%) with a dose-dependent effect in patients with type 2 diabetes. In one of them, it also reduced fasting plasma glucose (by 0.34 mmol/L) [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Three meta-analyses comparing different dietary approaches in people with prediabetes and type 2 diabetes concluded that a low-carb diet was the most effective one for decreasing BMI and raising HDL-c and one of the most effective ones (together with the Mediterranean diet) for lowering HbA1c [\[R\]](#), [\[R\]](#), [\[R\]](#).

Compared to low-fat diets, low-carb diets are more effective at raising HDL-c and reducing HbA1c and weight in type 2 diabetes patients according to 2 meta-analyses [\[R\]](#), [\[R\]](#).

In patients with metabolic syndrome, low-carb diets lower insulin levels according to a meta-analysis of 13 trials [\[R\]](#).

A meta-analysis of 17 trials associated low-carb diets with lower fasting glucose (by 1.05 mg/dL), HbA1c (by 0.21%), and insulin (by 2.25 mIU7mL) [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Women with your [AMY1A](#) gene variant may have an increased risk of type 2 diabetes if they eat a diet high in carbohydrates [\[R\]](#).

Women with your [AMY1A](#) gene variant may have an increased risk of type 2 diabetes if they eat a diet high in carbohydrates [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
AMY1B	rs6696797	AA	
AMY2B	rs4244372	AT	

15

Avoid Organochlorine Pesticide Exposure

IMPACT

3 / 5

EVIDENCE

4 / 5

How to implement

Minimize exposure by choosing organic fruits and vegetables, thoroughly washing produce before consumption, and avoiding areas where organochlorine pesticides are applied. Consider using air purifiers in homes close to agricultural areas to reduce indoor pesticide levels.

Description

Reducing organochlorine pesticide exposure involves minimizing contact with pesticides like DDT, which can accumulate in the body and potentially lead to adverse health effects, including disruption of hormonal functions and carcinogenicity.

How it helps

A meta-analysis of 22 studies identified organochlorines such as DDT, heptachlor, HCB, DDT, and trans-nonachlor or chlordane as pesticides increasing the risk of type 2 diabetes [R].

Two meta-analyses (the largest one with 23 studies) associated exposure to p,p'-DDE with 33-44% higher risk of type 2 diabetes, but not gestational diabetes [R, R].

Another meta-analysis (43 studies) found that DDT exposure increases the risk of type 2 diabetes by 61%, while DDE increases it by 67%. The association was strongest in Asian populations [R].

A meta-analysis of 41 studies associated high exposure to chlorinated pesticides with 2-fold higher risk of type 2 diabetes [R].

A meta-analysis of 12 studies and 6789 participants concluded that exposure to hexachlorocyclohexane increases their risk of metabolic syndrome by 36%, while transnonchlor increases it by 25% [R].

Another meta-analysis (7 studies) associated exposure to oxychlordane with 96% higher risk of type 2 diabetes, trans-nonachlor with a 143% higher risk, and heptachlor epoxide with 88% higher risk [R].

A study of 749 non-diabetic participants found a strong association between organochlorines and insulin resistance [R].

16



Eat Fiber-Rich Foods

IMPACT

3 / 5

EVIDENCE

4 / 5

How to implement

Incorporate foods high in fiber, such as fruits, vegetables, whole grains, and legumes, into your daily meals. Aim for a total dietary fiber intake of 25 to 30 grams per day, spread out over all meals.

Description

Fiber is a type of carb that your body can’t digest which supports digestion, heart health, and blood sugar control. You can get fiber by eating things like whole grains, fruits, nuts, seeds, and leafy greens.

Fiber is a type of carb that your body can’t digest. It supports digestion, heart health, blood sugar control, and more [\[R, R\]](#).

Adults should get 28 g of fiber every day. Most people in the US don’t get enough fiber [\[R, R\]](#).

You can get more fiber by eating [\[R, R\]](#):

- Whole grains
- Fruits
- Leafy greens
- Nuts and seeds
- Beans
- Broccoli

Fiber supplements, such as [psyllium husk](#), are available for people who don’t get enough fiber from their diets [\[R, R\]](#).

How it helps

Dietary fiber may help reduce blood sugar levels. **People who eat more fiber may be at a lower risk of diabetes** [\[R, R, R\]](#).

This is because **fiber delays the absorption of sugar**, which prevents blood sugar spikes. It may even boost your response to insulin [\[R, R, R, R, R\]](#).

[Mediterranean](#) and vegetarian diets are rich in high-fiber foods that may help control blood sugar [\[R, R, R, R, R\]](#).

High-fiber foods that may benefit blood sugar include:

- [Flaxseed](#) [\[R, R\]](#)
- Chia seed [\[R, R, R\]](#)
- [Fenugreek](#) [\[R, R, R, R\]](#)

For people who don’t get enough fiber from diet, potential supplements include:

- [Resistant starch](#) [\[R, R, R\]](#)
- [Inulin](#) [\[R, R, R\]](#)
- [Psyllium husk](#) [\[R, R, R, R\]](#)

Note that a diet high in sugary foods may cancel out the protective effects of dietary fiber [\[R\]](#).

17



Whole Grains

IMPACT3 / 5

EVIDENCE4 / 5

How to implement

Incorporate at least three servings of whole grains into your daily diet. This can include consuming foods such as whole grain bread, brown rice, whole grain pasta, and oats. Aim to replace refined grains with whole grains at each meal for optimal benefits.

Description

Whole grains encompass a variety of grains like wheat, oats, and quinoa, where the entire grain kernel is intact. They are rich in fiber, vitamins, minerals, and antioxidants, supporting heart health and reducing the risk of chronic diseases.

Unlike refined grains, whole grains contain nutritious parts of the grain like bran and germ.

Whole grains provide many crucial nutrients, including:

- Fiber
- B-vitamins
- Iron
- Magnesium
- Phosphorus

Due to their high fiber content, whole grains don’t tend to spike blood sugar like refined grains do.

How it helps

Dietary fiber may help reduce blood sugar levels. **People who eat more fiber may be at a lower risk of diabetes** [R, R, R].

This is because **fiber delays the absorption of sugar**, which prevents blood sugar spikes. It may even boost your response to insulin [R, R, R, R, R].

As opposed to refined grains, which spike your blood sugar and insulin, refined grains are a rich source of fiber that may help manage blood sugar. **Note that a diet high in sugary foods may cancel out the protective effects of whole grains** [R].

18



Chia Seeds

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Incorporate 1 to 2 tablespoons of chia seeds into your daily diet. You can add them to yogurt, smoothies, oatmeal, or salads. Do this regularly as part of your daily meals.

Description

Chia seeds are high in fiber, omega-3 fatty acids, and various vitamins and minerals. Adding chia seeds to your diet can support digestive health, provide essential nutrients, and contribute to overall nutritional wellness.

Chia seeds are a healthy source of omega-3s, calcium, as well as fiber, iron, magnesium phosphorus, and vitamins B1 and B3. A 1-ounce serving provides 5.06 g of ALA.

How it helps

In 3 non-placebo-controlled trials of 39 healthy people, dietary supplementation with chia seeds (7-24 g) reduced glucose spikes after meals by turning glucose into a slow-release sugar. However, consuming a higher dose (35 g) for 12 weeks had no effects on glycemic control in a placebo-controlled trial of 26 people [\[R, R, R, R\]](#).

In 2 placebo-controlled trials of 97 people with type 2 diabetes, consuming chia seeds (33-41 g/day) for 12-24 weeks maintained blood sugar and fat control, promoted weight loss, and helped prevent heart disease [\[R, R\]](#).

A meta-analysis of 12 trials included lowering blood glucose after meals among the health benefits of chia seeds [\[R\]](#).

19



Hazelnuts

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Incorporate a handful of hazelnuts (about 1 ounce or 28 grams) into your diet daily. You can eat them as a snack, sprinkle chopped hazelnuts over salads, or use hazelnut butter in smoothies. Ensure they are unsalted to keep your sodium intake low.

Description

Hazelnuts are a nutrient-dense nut rich in healthy fats, fiber, and essential vitamins and minerals. Incorporating hazelnuts into your diet can support heart health, provide energy, and contribute to overall nutritional wellness.

Hazelnuts are a good source of manganese, magnesium, as well as being really good for vitamin E, B6, and healthy fats. A 1-ounce serving provides 1.6 mg of manganese or 70%DV.

How it helps

A meta-analysis of 15 trials found that hazelnut consumption lowers fasting glucose by 0.90 mmol/L in people with type 2 diabetes. Combining them with other nuts may lower both fasting glucose and HbA1c [\[R\]](#).

Hazelnuts are rich in dietary fiber, healthy fats, and protein, which can slow sugar absorption. They also contain magnesium, which may further aid in blood sugar control.

20



Inulin

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take 5 grams of inulin supplement daily, mixing it with water, other beverages, or food. It can be taken all at once or divided into smaller doses throughout the day. Start with a lower dose to assess your tolerance and gradually increase. Continue taking inulin daily for at least 4-8 weeks to assess its benefits on gut health.

TYPICAL STARTING DOSE

5 g

Description

Inulin is a type of dietary fiber found in certain plants. It can support digestive health by promoting the growth of beneficial gut bacteria and aiding regular bowel movements.

How it helps

A meta-analysis of 20 studies and 607 participants concluded that supplementation with inulin may improve blood glucose control, but only in people with type 2 diabetes [\[R\]](#).

Two more recent meta-analyses (one of them with 33 studies and 1,346 participants) concluded that inulin reduces fasting blood glucose, fasting insulin, HbA1c, and insulin resistance, especially in people with type 2 diabetes or prediabetes [\[R\]](#), [\[R\]](#).

Inulin is rich in soluble fiber that may decrease blood sugar spikes.

21



Sleep for 7+ Hours

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Ensure you allocate enough time in your schedule to achieve a minimum of 7 hours of sleep each night. This might involve going to bed earlier or adjusting your evening routine to promote relaxation and make it easier to fall asleep.

Description

Optimizing sleep involves adopting healthy sleep habits and creating a sleep-conducive environment to ensure restorative and sufficient sleep duration. It supports cognitive function, mood stability, and overall physical health. Most experts recommend getting **at least 7 hours of good-quality sleep each night**.

[Sleep](#) supports your body and mind [\[R, R\]](#). More precisely, sleep helps:

- Support brain health [\[R, R\]](#)
- Maintain a healthy weight and appetite [\[R, R, R\]](#)
- Regulate blood pressure [\[R, R\]](#)
- Balance blood sugar [\[R, R\]](#)

Ways to sleep better include [\[R\]](#):

- Reducing your bright light exposure (screen time) in the evenings
- Sticking to a regular sleep schedule
- Avoiding hunger or large meals before bed
- Avoiding nicotine, caffeine, and alcohol before bed
- Maintaining a sleep area that’s cool, dark, and quiet

How it helps

Poor sleep can alter [\[R, R\]](#):

- Your appetite
- Food cravings
- Sugar metabolism
- Insulin sensitivity

Getting too little or too much sleep may increase blood sugar levels in the long run [\[R, R, R, R, R\]](#).

Lack of sleep in particular may cause [insulin resistance](#) [\[R, R\]](#).

22



Tai Chi

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Practice Tai Chi for 30 to 60 minutes at least twice a week. Choose a quiet, spacious area and follow along with a qualified instructor, either in person at a class or through an online video tutorial, to ensure proper technique and maximum benefit.

TYPICAL STARTING DOSE

1 hour

Description

Tai Chi is a traditional Chinese mind-body practice involving slow, flowing movements and deep breathing. It is known for its potential to reduce stress, improve balance, and enhance overall physical and mental well-being.

Tai chi involves gentle movements and breathing to strengthen and relax the mind and body. Practicing tai chi may help [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Manage pain
- Improve fitness
- Increase well-being
- Improve sleep and mood

How it helps

Multiple meta-analyses found that tai chi lowers fasting glucose, HbA1c, body composition, triglycerides, cholesterol, and quality of life in patients with type 2 diabetes. The 24-style simplified tai chi with high exercise frequency and short duration may be most effective. In older participants with this condition or at risk, it may also improve physical function and well-being [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Tai chi may help by combining physical activity with stress reduction, potentially enhancing insulin sensitivity and glucose metabolism.

23



Cinnamon

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take a 1 g cinnamon supplement once daily, ideally with a meal to aid absorption. This can be in the form of a capsule or tablet. Continue this regimen as long as it aligns with your health goals and under the guidance of a healthcare provider.

TYPICAL STARTING DOSE

500 mg

Description

Cinnamon is a popular spice that may have various health benefits, including improving blood sugar control, reducing inflammation, and providing antioxidants. It's commonly used in both culinary and herbal applications.

[Cinnamon](#) is a spice made from the bark of *Cinnamomum* trees. Cinnamon can [\[R\]](#):

- Decrease inflammation
- Fight [oxidative stress](#)
- Kill microbes

Cinnamon is mainly used in cooking and fragrances. **As a natural remedy, people use cinnamon to reduce blood sugar** [\[R\]](#).

There are two main types of cinnamon [\[R\]](#):

- Ceylon or ‘true’ cinnamon (*Cinnamomum verum*)
- Chinese or Cassia cinnamon (*Cinnamomum cassia*)

How it helps

Cassia cinnamon (120-6,000 mg/day for 4-18 weeks) may improve blood sugar control [\[R, R, R, R\]](#).

It may help by [\[R, R, R\]](#):

- Preventing oxidative stress
- Reducing [insulin resistance](#)

However, health experts say there’s not enough evidence to recommend cinnamon supplementation for diabetes [\[R\]](#).

Please note: *Cassia cinnamon is high in coumarin. This substance may harm the liver in large amounts. Consult your doctor before supplementing with high doses of Cassia cinnamon* [\[R, R, R\]](#).

 PERSONALIZED TO YOUR GENES

Your **ADIPOQ** gene variant is linked to diabetes. This gene helps make adiponectin, a hormone that reduces blood sugar. Cinnamon may increase adiponectin levels [\[R, R, R, R, R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
RFC4	rs266729	GC	

24



Beta-Glucans

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Take a beta-glucan supplement daily, with a dosage ranging from 250mg to 500mg. It is best consumed with a meal to enhance absorption. Continue this routine daily to support immune health.

Description

Beta-glucans are types of soluble fiber found in foods like oats and barley. They have been associated with immune system support and may help lower cholesterol levels when consumed as part of a heart-healthy diet.

Beta-glucan is a type of soluble fiber with antioxidant properties. It is abundant in [\[R\]](#) [\[R\]](#):

- Baker's yeast
- Cereals (e.g., oats, barley)
- Mushrooms (e.g., maitake)
- Seaweeds

People use beta-glucans to [\[R\]](#) [\[R\]](#) [\[R\]](#) [\[R\]](#) [\[R\]](#):

- Improve immunity (e.g., fight infections)
- Reduce blood sugar
- Reduce cholesterol

How it helps

A meta-analysis of 126 studies concluded that supplementation with beta-glucans lowers fasting glucose by 2.58 mmol/L but warned about the high heterogeneity of the studies. Another meta-analysis (103 trials) found that adding beta-glucans to carbohydrate-containing meals lowers glycemic and insulinemic responses by approximately 25% [\[R\]](#) [\[R\]](#).

In diabetic patients, beta-glucans (6 g/day for 4 weeks or lower doses for 12 weeks) lowers fasting glucose (by 0.52 mmol/L) and HbA1c (by 0.21%) according to 2 meta-analyses (the largest one with 10 studies) [\[R\]](#) [\[R\]](#).

In hypercholesterolemic subjects, beta-glucan supplementation lowers fasting glucose (by 0.05 mmol/L) and fasting insulin (0.75 pmol/L) according to a meta-analysis of 12 trials and 603 participants [\[R\]](#).

25



Black Seed Oil

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take one to two teaspoons (5-10ml) of black seed oil twice daily, preferably before meals. For capsule forms, follow the manufacturer's instructions, commonly 500mg capsules twice daily. Continue this regimen for up to 8 weeks to evaluate its effects.

TYPICAL STARTING DOSE

2 tsp

Description

Both black seed extract and black seed oil have been traditionally used for their potential health benefits, including anti-inflammatory and antioxidant properties. They may support overall wellness and immune function when incorporated into a balanced diet.

[Black seed](#) (black cumin) and its oil are used in cooking and traditional medicine [\[R\]](#).

People mainly use black seed for [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Allergies
- Joint pain

How it helps

Two meta-analyses (the largest one with 50 studies) concluded that supplementation with black seed lowers fasting glucose (by 9.93-15.18 mg/dL), postprandial blood glucose (by 14.79 mg/dL), and HbA1c (0.45-0.57%). Black seed oil was found more effective than black seed powder in one of them [\[R\]](#), [\[R\]](#).

A meta-analysis of 7 studies found that supplementation with black seed lowers fasting blood glucose (by 17.84mg/dL) and HbA1c (by 0.71%) in people with type 2 diabetes [\[R\]](#).

26



Green Coffee Extract

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take a 400 mg dose of green coffee extract supplement daily. This can be consumed in the morning or as directed on the supplement’s packaging.

TYPICAL STARTING DOSE
400 mg

Description

Green coffee extract is believed to support weight management due to its high content of chlorogenic acids, which may help regulate blood sugar levels and promote fat metabolism.

Green coffee is made from unroasted coffee beans. It’s rich in an anti-inflammatory and antioxidant compound called [chlorogenic acid](#) [R, R].

Green coffee may help lower [R]:

- Blood pressure
- Weight
- Blood sugar levels

How it helps

Three meta-analyses (the largest one with 15 studies and 637 participants) concluded that green coffee bean extract lowers fasting glucose (by 1.79-2.35 mg/dL) and insulin (by 0.63 μU/L). In one of them, green coffee extract only lowered insulin (by 1.942 mg/dL) at doses above 400 mg/day [R, R, R].

Green coffee beans are rich in chlorogenic acid, which may decrease glucose absorption and affect how the body handles this sugar.

Please note: *Green coffee bean extract contains caffeine. Keep this in mind if you're trying to limit your caffeine intake. If you're pregnant, limit caffeine to 200 mg per day* [R].

Please note: *chlorogenic acid from green coffee beans may inhibit the production of the thyroid hormone T4 (thyroxine). Individuals with thyroid disorders, particularly hypothyroidism or low T4 levels, should exercise caution when using coffee bean extract and always consult with a healthcare provider before taking this supplement* [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.*

27



Fenugreek

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take a 500 mg fenugreek supplement daily, preferably with a meal to aid in digestion and absorption.

TYPICAL STARTING DOSE

500 mg

Description

Fenugreek is an herb and spice commonly used in traditional medicine for its potential to support digestive health, regulate blood sugar levels, and promote lactation in nursing mothers. Its compounds, such as soluble fiber and fenugreek seeds, contribute to its various health benefits.

[Fenugreek](#) is a leafy green legume originating from central Asia. Its leaves and seeds are both used in cooking. Some people also use the seeds to make tea [[R](#), [R](#)].

People use fenugreek tea or supplements for [[R](#), [R](#), [R](#), [R](#)]:

- Reproductive health
- Blood sugar control
- Decreasing cholesterol

How it helps

Consuming fenugreek seeds (3-15 g/day) for up to 60 days reduced fasting and post-meal blood sugar levels and improved insulin sensitivity in several placebo-controlled trials of 60 healthy people and 163 with type 2 diabetes [[R](#), [R](#), [R](#), [R](#), [R](#), [R](#)].

Fenugreek extract (1-2 g/day) and saponins (6.3 g/day) lowered blood glucose (fasting and post-meal), HbA1c, BMI, quality of life, and kidney and liver functions in 3 placebo-controlled trials of 20 healthy volunteers and 81 people with type 2 diabetes [[R](#), [R](#), [R](#)].

A meta-analysis of 10 studies and 1,173 participants confirmed the effectiveness of fenugreek seeds (1-50 g/day for 1-4 months) at lowering fasting blood glucose, post-meal blood glucose, HbA1c, and total cholesterol [[R](#)].

28



Stinging Nettle

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Take a 300 to 600 mg capsule of stinging nettle extract daily with water, ideally with a meal to reduce the risk of stomach discomfort. Continue for at least 3 months to observe benefits.

TYPICAL STARTING DOSE

300 mg

Description

Stinging nettle is a plant known for its stinging hairs on its leaves and stems, and is native to parts of Europe and Asia. It has been used in traditional medicine as an herbal remedy and today as a dietary supplement. It contains compounds like flavonoids, polyphenols, and vitamins A and C, iron, and calcium. This helps it provide potential benefits for allergies and arthritis.

[Stinging nettle](#) (*Urtica dioica*), also known as common nettle, is a herb that grows all over the world. Coming in contact with the stinging hairs on the leaves and stems may cause a burning sensation [\[R\]](#), [\[R\]](#), [\[R\]](#).

In ancient Egypt, it was commonly used to treat arthritis. Stinging nettle has also been used to [\[R\]](#):

- Reduce inflammation
- Relieve allergies
- Control blood pressure
- Improve wound healing
- Support prostate health

Stinging nettle is available in many forms, including:

- Capsules
- Tincture
- Tea
- Cream
- Leaves

How it helps

In a placebo-controlled trial of 92 people with type 2 diabetes, taking stinging nettle extract (500 mg, 3x/day) for 3 months as an add-on to antidiabetic drugs lowered blood glucose (both fasting and post-meal) and HbA1c levels [\[R\]](#).

The combination of stinging nettle, boswellia gum resin, and milk thistle (1 capsule containing 200 mg of each extract, 3x/day) lowered fasting blood glucose and glycated hemoglobin in a 3-month placebo-controlled trial of 60 people with type 2 diabetes [\[R\]](#).

A meta-analysis of 8 trials and 401 participants concluded that supplementation with stinging nettle (1.5-10 g/day) for 8-12 weeks may reduce fasting blood sugar, but not HbA1c, in people with type 2 diabetes [\[R\]](#).

Chemicals in nettle leaves and stems (but not roots) appear to trigger the release of insulin and other compounds that reduce blood sugar [\[R\]](#).

29



Avoid PAHs Exposure

IMPACT3 / 5

EVIDENCE3 / 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

Two meta-analyses (the largest one with 9 studies) associated high levels of urinary PAH metabolites such as naphthalene, fluorine, phenanthrene, and total mono-hydroxylated metabolites with a higher risk of type 2 diabetes (by 47-52%, 50-53%, 41-43%, and 49-61%, respectively). A 1-fold increase in fluorine and phenanthrene increases the risk by 9% and 19%, respectively [\[R, R\]](#).

PAHs may cause insulin resistance.

30



Alpha-Lipoic Acid

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take 600-1800 mg of alpha-lipoic acid daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

100 mg

Description

[Alpha-lipoic acid](#) is a natural antioxidant found in almost every cell in your body. People use alpha-lipoic acid to help with issues like skin aging, weight loss, and high blood sugar [\[R, R, R\]](#).

People use alpha-lipoic acid to help with [\[R, R, R, R\]](#):

- Complications of high blood sugar
- Skin aging
- Weight loss
- Carpal tunnel syndrome

How it helps

ALA has similar effects as insulin. It may help your body use sugar more efficiently [\[R, R\]](#).

ALA is also a powerful antioxidant. [Oxidative stress](#) can make diabetes worse, and ALA may protect against it [\[R, R\]](#).

ALA is approved for diabetes in some countries. **It may help with complications of diabetes**, including [\[R, R, R, R\]](#):

- Nerve damage
- Kidney damage
- Eye damage

Supplementing with ALA may improve long-term blood sugar control. It may also reduce inflammation and cholesterol [\[R, R, R\]](#).

31



Glucomannan

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take 1 gram of glucomannan powder with 8 ounces of water, 15 minutes to 1 hour before each meal, three times daily. It's essential to drink plenty of water when taking glucomannan to ensure it reaches the stomach and expands, helping to promote a feeling of fullness.

TYPICAL STARTING DOSE

3 g

Description

Glucomannan is a dietary fiber derived from the root of the konjac plant and is often used as a weight loss supplement. It may promote feelings of fullness and support weight management when used in conjunction with a balanced diet.

How it helps

A meta-analysis of 14 studies and 531 participants found that supplementation with glucomannan lowers fasting glucose by 7.44 mg/dL [\[R\]](#).

In patients with type 2 diabetes, glucomannan reduces fasting glucose, postprandial glucose, fasting insulin, fructosamine, total cholesterol, and LDL cholesterol according to a meta-analysis of 6 trials and 440 participants [\[R\]](#).

Glucomannan may help by slowing glucose absorption.

32



Black Seed (Black Cumin)

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take 1000 mg of black seed (black cumin) supplement daily, preferably split into two doses of 500 mg each, one in the morning and one in the evening.

TYPICAL STARTING DOSE

1000 mg

Description

Black seed, also known as black cumin or *Nigella sativa*, has been used for its potential health benefits in traditional medicine. It is believed to have anti-inflammatory, antioxidant, and immune-boosting properties.

[Black seed](#) (black cumin) and its oil are used in cooking and traditional medicine [\[R\]](#).

People use black seed for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Asthma
- Allergies
- High blood sugar
- High blood pressure
- Joint pain

How it helps

Two meta-analyses (the largest one with 50 studies) concluded that supplementation with black seed lowers fasting glucose (by 9.93-15.18 mg/dL), postprandial blood glucose (by 14.79 mg/dL), and HbA1c (0.45-0.57%). Black seed oil was found more effective than black seed powder in one of them [\[R\]](#), [\[R\]](#).

A meta-analysis of 7 studies found that supplementation with black seed lowers fasting blood glucose (by 17.84mg/dL) and HbA1c (by 0.71%) in people with type 2 diabetes [\[R\]](#).

33



Whey Protein

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Mix one scoop (approximately 25-30 grams) of whey protein powder with 8-12 ounces of water, milk, or your preferred beverage. Consume this drink 1-2 times per day, ideally post-workout or as a meal replacement.

TYPICAL STARTING DOSE

25 g

Description

Whey protein is a complete protein derived from milk during cheese production. It is rich in essential amino acids and is used to support muscle recovery, promote muscle growth, and provide a convenient protein source for athletes and fitness enthusiasts.

Whey is the liquid that separates from milk when cheese is made. [Whey protein](#) is full of amino acids (protein building blocks) that the body needs [\[R\]](#), [\[R\]](#).

Whey protein usually comes in the form of a powder that can be added to soft foods and drinks. People often use it to help with [\[R\]](#), [\[R\]](#):

- Athletic performance
- Nutritional deficiencies

How it helps

In 8 non-placebo-controlled trials of 216 type 2 diabetic subjects, whey protein (27.6-55 g) taken during a meal increased the insulin response (by 31-57%) and significantly decreased the blood glucose response (by 13-46%) [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

In 3 non-placebo-controlled trials of 42 healthy volunteers, whey protein (9-70 g) significantly increased insulin response while decreasing blood glucose response [\[R\]](#), [\[R\]](#), [\[R\]](#).

Whey protein also lowered fasting glucose and insulin resistance while increasing blood insulin in 4 non-placebo-controlled trials of 111 overweight and obese people [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

A meta-analysis of 37 studies concluded that whey protein significantly reduces fasting blood glucose in obese and overweight people [\[R\]](#).

34



Avoid PCBs

IMPACT

3 / 5

EVIDENCE

3 / 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

A meta-analysis of 2 studies and 1095 women associated exposure to PCBs with 70% higher risk of type 2 diabetes [\[R\]](#).

Another meta-analysis (48 studies) associated high PCB levels with a 2.3-fold higher risk of type 2 diabetes [\[R\]](#).

A meta-analysis of 22 studies associated exposure to PCBs with diabetes and metabolic syndrome. Specifically, DL-PCB-126 increased the risk of metabolic syndrome while DL-PCB-118, PCB-153, and PCB-180 increased the risk of diabetes [\[R\]](#).

Exposure to PCBs also increases the risk of gestational diabetes (by 14%) according to 2 meta-analyses (the largest one with 42 studies). A study of 208 pregnant women associated PCB-153, PBDE-28, and total PCBs with respectively 25%, 19%, and 37% higher risk of gestational diabetes [\[R\]](#), [\[R\]](#).

35



Avoid Phthalate Exposure

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

To avoid phthalate exposure, check product labels and choose phthalate-free options for personal care items, plastics (look for recycling codes 3 and 7 or the letters 'V' or 'PVC'), and household products. Additionally, reduce the use of plastic containers for food storage, especially those not marked as 'phthalate-free', and avoid microwaving food in plastic containers. Aim to make these changes consistently in your daily life for long-term health benefits.

Description

Avoiding phthalate exposure involves choosing phthalate-free products, such as personal care items and plastics, to minimize potential endocrine-disrupting effects and protect reproductive and hormonal health.

How it helps

A meta-analysis of seven studies involving 12,139 participants found that higher urinary concentrations of phthalates were positively associated with an increased risk of diabetes mellitus, with pooled odds ratios ranging from 1.27 to 3.11 [\[R\]](#).

A systematic review and meta-analysis of 49 cross-sectional and prospective studies revealed that elevated urinary concentrations of bisphenol A (BPA) and phthalates were associated with an increased risk of type 2 diabetes. The pooled relative risks were 1.45 for BPA and 1.48 for phthalates, also indicating associations with impaired fasting glucose and insulin resistance [\[R\]](#).

A study involving 2,350 women from the National Health and Nutrition Examination Survey (NHANES) found that higher levels of various phthalate metabolites, including mono-n-butyl phthalate (MnBP), mono-isobutyl phthalate (MiBP), and monobenzyl phthalate (MBzP), were associated with an increased odds of diabetes. Women in the highest quartile for MBzP and MiBP had almost twice the odds of diabetes compared to those in the lowest quartile [\[R\]](#).

36



Ginger

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take a 500 mg ginger supplement daily, preferably with a meal to enhance absorption and minimize potential stomach discomfort.

TYPICAL STARTING DOSE

500 mg

Description

Ginger is a versatile spice known for its potential anti-inflammatory and digestive benefits. It may help alleviate nausea, reduce muscle soreness, and support gastrointestinal comfort when consumed as part of a balanced diet.

[Ginger root](#) is a cooking spice and a traditional remedy. People mostly use it to relieve [\[R\]](#):

- Nausea
- Menstrual cramps
- Joint pain

How it helps

Three meta-analyses (the largest one including 9 trials and 490 participants) revealed that ginger supplementation (1-4 g/day) for 6-12 weeks can reduce fasting blood glucose, insulin resistance, and HbA1c in people with type 2 diabetes [\[R, R, R\]](#).

A meta-analysis of 14 trials and 473 participants found ginger also effective at lowering fasting glucose and insulin resistance in overweight and obese subjects [\[R\]](#).

37



Flaxseed

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Consume 2 tablespoons of ground flaxseed daily. You can add it to your breakfast cereal, smoothies, or salads.

TYPICAL STARTING DOSE

2 tbsp

Description

Flaxseed is a nutrient-dense food that's high in fiber and omega-3 fatty acids. It may contribute to heart health, promote digestive regularity, and help manage cholesterol levels when included in a balanced diet.

[Flaxseed](#) is a common ingredient in bakery products. Some people also use it as a health food to support digestion [\[R\]](#).

Flaxseed is rich in many compounds, including [\[R\]](#):

- Vitamins and minerals
- Protein
- Fiber
- Omega-3 fatty acids ([ALA](#))

How it helps

A meta-analysis of 25 trials and 1,879 participants concluded that consuming whole flaxseed (but not flaxseed oil or lignan extract) for 6-48 weeks reduces blood glucose and insulin levels while increasing insulin sensitivity in people with or at risk of type 2 diabetes [\[R\]](#).

Flaxseeds are high in fiber, which slows down the rate at which sugar is absorbed into the bloodstream. They also contain lignans that may help improve insulin sensitivity.

38



Paleo Diet

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Adopt a diet that includes lean meats, fish, fruits, vegetables, nuts, and seeds, resembling the diet of our hunter-gatherer ancestors. Exclude all dairy products, legumes, grains, added sugar, and processed foods. This should be a consistent dietary approach, not a short-term diet, to observe its benefits on health and well-being.

Description

The paleo diet, also known as the caveman diet, emphasizes whole foods such as lean meats, fish, fruits, vegetables, nuts, and seeds while excluding processed foods, grains, and dairy. It is believed to support weight management and reduce the risk of chronic diseases by focusing on foods more in line with our ancestors' diets.

How it helps

A meta-analysis of 56 trials and 4,937 found the paleo diet more effective than any other diet except the Mediterranean diet at lowering fasting blood glucose. Another meta-analysis (8 studies and over 1k people) found both diets equally effective at lowering HbA1c [\[R, R\]](#).

The Paleo diet excludes processed foods, sugars, and grains, which can spike blood sugar levels.

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Garlic

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Incorporate 1-2 cloves of raw garlic into your meals daily. This can be achieved by finely chopping or crushing the garlic and letting it sit for a few minutes before adding it to your dishes to maximize its health benefits.

Description

Garlic is a popular herb known for its potential cardiovascular benefits, including lowering blood pressure and cholesterol levels. It also possesses antimicrobial properties and may support immune function.

[Garlic](#) is a vegetable often used to flavor food. It’s been a part of traditional medicine for thousands of years [\[R\]](#).

Today, people take garlic to help control their blood pressure and cholesterol [\[R\]](#).

How it helps

A meta-analysis of 7 trials and 513 participants found that including garlic in the diet significantly lowered fasting blood glucose. Another meta-analysis (33 studies and 1,273 participants) found garlic effective at improving fasting blood glucose, HbA1c, and blood fat profile [\[R\]](#), [\[R\]](#).

 PERSONALIZED TO YOUR GENES

The [TNF](#) gene helps make [TNF-alpha](#), a key inflammatory protein. Increased blood levels of TNF-alpha are closely linked to [insulin resistance](#) and may even directly increase blood sugar [\[R\]](#), [\[R\]](#), [\[R\]](#).

Your genotype for [rs2857605](#) has been associated with increased [blood sugar](#). It may increase TNF-alpha production, leading to insulin resistance [\[R\]](#), [\[R\]](#).

People who consume significant amounts of [garlic](#) tend to have lower TNF-alpha levels. In a meta-analysis of 7 clinical trials, including garlic in the diet reduced blood sugar [\[R\]](#), [\[R\]](#).

>>> *To learn more about the link between the TNF gene and blood sugar, check out the full SelfDecode blog post [here](#).*

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
TNF	rs2857605	TC	

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Legumes

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Incorporate a serving of legumes, such as beans, lentils, chickpeas, or peas, into your diet at least four times a week. A serving size is approximately half a cup cooked. Ensure to prepare them properly by soaking and rinsing beans, if applicable, to reduce anti-nutrients and improve digestibility.

Description

Legumes, such as beans, lentils, and chickpeas, are excellent sources of plant-based protein, fiber, and various vitamins and minerals. Including legumes in your diet can promote satiety and support digestive health.

Legumes are plants from the *Fabaceae* family. Their edible seeds are called **pulses**. Legumes are important food staples and sources of carbohydrates, fiber, protein, iron, and other key nutrients.

Common legumes include:

- Peanuts
- Beans
- Chickpeas
- Peas
- Lentils

How it helps

A meta-analysis found that a low-glycemic-index diet rich in legumes lowers HbA1c by 0.5% [\[R\]](#).

In line with this, the following legumes have been found to lower blood glucose:

- Chickpeas [\[R\]](#)
- Common beans [\[R\]](#)
- Fenugreek [\[R\]](#)

Legumes may help because they are rich in fiber and proteins, and low in digestible starch.

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Moringa

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take 400-800 mg of moringa leaf powder capsule form once daily, preferably with meals to enhance absorption. For fresh moringa leaves, a dose of 10 grams daily can be consumed directly or added to meals. Continue this regimen for at least 3 to 6 months to observe significant benefits.

TYPICAL STARTING DOSE

400 mg

Description

Moringa is a nutrient-dense plant known for its high levels of vitamins, minerals, and antioxidants. It is used in traditional medicine for a range of issues due to it's potential anti-inflammatory, antioxidant, and antimicrobial properties.

How it helps

- Moringa leaf tablets taken for up to 3 months reduced both blood glucose and glycated hemoglobin (HbA1C) in 2 trials (1 of them placebo-controlled) of 121 people with type 2 diabetes [\[R\]](#), [\[R\]](#).
- Similarly, high doses (4-20 g/day) of moringa leaf powder reduced blood glucose while increasing insulin production in 3 non-placebo-controlled trials of 20 healthy volunteers, 17 people with type 2 diabetes, and 90 postmenopausal women [\[R\]](#), [\[R\]](#), [\[R\]](#).
- Cookies containing stevia leaf powder (3%) lowered post-meal blood glucose in a placebo-controlled trial of 20 healthy volunteers [\[R\]](#).

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Tart Cherries

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Consume about 200 grams (7 ounces) of tart cherries or drink 240 ml (8 ounces) of tart cherry juice daily. This can be done at any time of the day but consuming it in the evening might improve sleep quality. It is recommended to continue daily consumption for at least 4 weeks to observe benefits such as reduced muscle pain, improved sleep, and potential reduction in inflammation.

Description

Tart cherries, often available in the form of juice or supplements, has vitamin C, as well as anthocyanins and melatonin, known for their potential to reduce inflammation and improve sleep quality. They are rich in antioxidants and may aid in recovery from exercise-induced muscle soreness.

Cherries are stone fruits with numerous species. Tart or “sour” cherries (*Prunus cerasus*) are native to parts of Europe and Asia [\[R\]](#), [\[R\]](#).

They are close to regular, sweet cherries (*Prunus avium*) but more acidic. Hence, people do not eat them fresh but dried or in syrups, salads, pies, or liqueurs.

People consume tart cherries to help with [\[R\]](#):

- Gout
- Exercise recovery
- Blood sugar control
- Blood pressure

How it helps

A meta-analysis of 10 trials concluded that drinking tart cherry juice lowers fasting glucose by 0.51 mg/dL. The effects were stronger in obese participants, those older than 40 years old, and studies followed up for less than 4 weeks [\[R\]](#).

43



Myo-inositol

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Take 2 grams of myo-inositol supplement orally twice a day, preferably with meals to enhance absorption. This regimen should be followed daily for at least 6 months to observe significant benefits.

TYPICAL STARTING DOSE

4 g

Description

Myo-inositol is a naturally occurring compound that plays a role in various cellular functions. It is used in dietary supplements and is believed to have potential benefits for mental health, hormone regulation, and insulin sensitivity.

Inositol is a type of sugar that our bodies need to function. It was considered a vitamin (vitamin B8) until it was discovered that our bodies can make it from another common sugar, glucose [\[R\]](#).

[Myo-inositol](#) is the most common form of inositol. It plays a role in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Heart health
- Normal blood sugar levels
- Mental health
- Cognitive function
- Reproductive health

Myo-inositol can convert to [D-chiro-inositol](#) in the body. These two forms of inositol are often combined in supplements. People use them to improve blood sugar control and PCOS [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

In 4 placebo-controlled trials of 706 healthy pregnant women, supplementation with myo-inositol (4 g/day) for up to 28 weeks reduced insulin resistance and gestational diabetes rates. The effect was strongest in overweight women, who are at highest risk [\[R\]](#), [\[R\]](#), [\[R\]](#).

A supplement with myo-inositol, chiro-inositol, folic acid, and manganese improved glycemic and blood fat parameters in a placebo-controlled trial of 24 healthy pregnant women [\[R\]](#).

In a placebo-controlled trial of 69 pregnant women with gestational diabetes, myo-inositol (4 g/day) combined with folic acid reduced fasting glucose and insulin levels, ultimately improving insulin resistance [\[R\]](#).

Myo-inositol (2-4 g/day) combined with folic acid and taken for 12-14 weeks reduced insulin levels and insulin resistance in 2 placebo-controlled trials of 70 overweight women with PCOS. but not in another one of 92 women with this condition. In 2 non-placebo-controlled trials of 152 pregnant women with PCOS, myo-inositol was more effective than metformin at preventing gestational diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

In a placebo-controlled trial of 80 women with metabolic syndrome, treatment with myo-inositol (4 g/day) for 12 months improved blood glucose, insulin resistance, and blood fat profile [\[R\]](#).

Myo-inositol mimics the effects of insulin and seems to enhance insulin sensitivity. Based on the studies so far, it seems better suited for overweight women [\[R\]](#).

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Relaxation Techniques

IMPACT

3 / 5

EVIDENCE

3 / 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

Stress releases chemicals that are linked to high blood sugar levels. **Stress from work and trauma in particular may increase blood sugar** [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Relaxation techniques that may balance blood sugar include:

- **Meditation:** helps you clear the mind and be aware of the present moment [\[R\]](#), [\[R\]](#), [\[R\]](#)
- **Yoga:** helps calm you down by combining breathing, stretching, and meditation [\[R\]](#), [\[R\]](#), [\[R\]](#)

45



Keto Diet

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Adopt a diet that consists of about 70-80% fat, 10-20% protein, and 5-10% carbohydrates. Eliminate or significantly reduce the intake of sugar and starches like bread, pasta, rice, and potatoes, focusing instead on high-fat foods like meats, fatty fish, eggs, butter, and healthy oils, as well as low-carb vegetables like leafy greens. This dietary pattern should be maintained consistently for a period of at least 3-4 weeks to achieve ketosis, after which it can be adjusted based on individual goals and responses.

Description

The keto diet is a high-fat, low-carbohydrate eating plan designed to induce a state of ketosis in the body, where it primarily burns fat for energy. It is often used for weight loss and managing certain medical conditions.

The ketogenic diet, or the ‘keto’ diet, is rich in fat and restricts carb intake [\[R, R\]](#).

On the ketogenic diet, 50 g of carbs or less are consumed per day. Around 55-80% of the calories come from fat [\[R\]](#).

The ketogenic diet depletes the body of sugars like glucose. When people fast or eat very little carbs, the body makes less insulin. In response, the body starts using fat for energy.

When the body only uses fat for energy, molecules called ketones are formed. This state is called *ketosis*.

The ketogenic diet may help with:

- Seizures [\[R\]](#)
- Excess weight [\[R\]](#)
- Diabetes [\[R, R\]](#)

How it helps

A meta-analysis of 13 studies and 567 participants confirmed the benefits of the ketogenic diet for glycemic control, blood fat profile, and weight loss in people with type 2 diabetes. Another meta-analysis (14 studies and 734 obese or overweight participants) found ketogenic diets more effective at improving HbA1c, insulin resistance, weight, and blood fat profile than low-fat diets, especially in those with diabetes [\[R, R\]](#).

The Keto diet may help by reducing carbohydrate intake.

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Practice Exercise Snacks

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Integrate short bursts of physical activity, each lasting about 1 to 2 minutes, into your daily routine at least two to three times a day. These 'exercise snacks' can include activities like doing a set of stairs, rapid bodyweight exercises, pull-ups, push-ups, sit-ups, or brisk walking.

TYPICAL STARTING DOSE

1 minutesute

Description

Staying physically active is essential for maintaining overall health and well-being. **Exercise snacks** are brief, frequent bursts of physical activity integrated into daily routines, helping combat the health risks associated with prolonged sitting and sedentary behavior, such as obesity and cardiovascular issues. Examples include taking the stairs or doing quick exercises during work breaks.

Staying active can do wonders for your health. It can help you lose weight, improve your heart health, boost your mood, and more [\[R\]](#).

Exercise snacks are short, quick bursts of physical activity performed throughout the day, designed to break up prolonged periods of sitting or inactivity. These brief bouts of exercise can be as short as a few minutes and are incorporated into daily routines to boost overall physical activity levels.

Exercise snacks are crucial for health because they combat the negative effects of sedentary behavior, such as prolonged sitting, which is associated with an increased risk of obesity, cardiovascular diseases, diabetes, and musculoskeletal issues. They help improve blood circulation, regulate blood sugar levels, and enhance mood and cognitive function.

Examples of exercise snacks include taking the stairs instead of the elevator, doing a few minutes of bodyweight exercises (e.g., squats or push-ups) during work breaks, or walking briskly for a few minutes after meals. These short, frequent bursts of activity contribute to a more active lifestyle and can significantly benefit overall health by reducing the risks associated with excessive sitting.

How it helps

Staying physically active is a great way to manage blood glucose levels, and it gets more effective with increased intensity and duration. Muscle activity burns glucose for energy and makes cells more sensitive to insulin [\[R\]](#).

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Soy Protein

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Include 20 grams of soy protein in your daily diet. This can be achieved by consuming soy-based products such as tofu, soy milk, or soy nuts throughout the day.

TYPICAL STARTING DOSE

20 g

Description

Soy protein is a high-quality plant-based protein derived from soybeans. It is commonly used in vegetarian and vegan diets and may support muscle growth, weight management, and overall nutritional needs.

Soy is a common food in many cuisines around the world, especially Asian cuisines [\[R\]](#).
It's a great source of [\[R\]](#), [\[R\]](#):

- Plant-based protein
- Fiber
- Omega-3 fats
- Antioxidants (isoflavones)

Soy-based foods include [\[R\]](#):

- Tofu
- Tempeh
- Edamame
- Miso
- Natto

Soy protein and soy isoflavones are also available as supplements.

How it helps

Soy protein may help reduce blood sugar. People who eat more soy or supplement with soy protein seem to be less likely to get diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#).

Soy protein is likely responsible for soy's beneficial effects on blood sugar. Soy also contains chemicals called *isoflavones* that may improve insulin sensitivity [\[R\]](#), [\[R\]](#), [\[R\]](#).

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White Mulberry

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take a supplement containing 500mg of white mulberry extract three times daily with meals. Continue this regimen for at least three months to evaluate its effects on blood sugar levels.

Description

White mulberry is a fruit tree whose leaves and fruit extracts are used in traditional medicine and dietary supplements. It is used for its potential to help regulate blood sugar levels and support weight management.

[White mulberry](#) (*Morus alba*) is a small tree native to northern China. People eat its berries fresh or use them to prepare wine. Its leaves and roots are used to prepare tea [\[R\]](#).

During ancient times, it was used to feed silkworms. *Morus alba* is used in traditional Chinese medicine for [\[R\]](#):

- High blood sugar
- High cholesterol
- High blood pressure
- Joint pain

How it helps

In 5 trials (3 of them placebo-controlled) of 119 healthy people, a single dose (0.4-1.2 g or 6.75-36 mg deoxynojirimycin) of white mulberry leaf extract reduced carbohydrate digestion and absorption, resulting in decreased blood sugar and insulin spikes after meals [\[R, R, R, R, R\]](#).

Taking the extract (1-5 g/day) for 2-4 weeks lowered fasting blood glucose (better than glibenclamide in one of the studies), post-meal glucose, and HbA1c in 3 placebo-controlled trials of 41 people with type 2 diabetes and 121 at risk of developing this condition. Moreover, 300 mg/day helped delay the progression of diabetic kidney damage by improving antioxidant status and blood fat profile in a 12-week placebo-controlled trial of 60 people [\[R, R, R, R, R\]](#).

A meta-analysis of 13 studies with mostly healthy participants confirmed the effectiveness of white mulberry at lowering post-meal blood glucose (but not fasting glucose, insulin resistance, or HbA1c) [\[R\]](#).

Taking a nutraceutical complex with white mulberry extract, red yeast rice, and berberine for 8-16 weeks lowered fasting glucose, blood insulin, and glycated hemoglobin, possibly reducing their risk of developing type 2 diabetes, in 2 placebo-controlled trials of 382 people with high blood fat levels [\[R, R\]](#).

White mulberry contains a compound called DNJ that slows down the breakdown of sugars in the gut.

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Pistachios

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Incorporate a handful of pistachios (about 1-2 ounces) into your daily diet. You can add them to your breakfast cereals, salads, or simply snack on them throughout the day. Do this regularly for ongoing heart health benefits and to aid in maintaining a balanced diet.

Description

Pistachios are a type of nut native to Asia but grown extensively in the Mediterranean. They are packed with healthy fats, fiber, protein, and various vitamins and minerals, like vitamins C, B6, and E, as well as potassium, copper, and iron. They are also rich in antioxidant and anti-inflammatory compounds, which can help lower cholesterol levels and support weight management.

The pistachio (*Pistacia vera L*), known as **the “green nut”**, is a nut native to Asia but widely cultivated in the Mediterranean. Pistachios have **low fat content** and high levels of [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Unsaturated fats
- Vitamins (C, B6, E, K, thiamin)
- Minerals (Potassium, copper, iron, and magnesium)

Pistachios also have a high **antioxidant and anti-inflammatory** effect [\[R\]](#).

How it helps

Three meta-analyses concluded that pistachio consumption lowers cardiometabolic risk factors such as fasting glucose, HbA1c, insulin, and insulin resistance in the general population. In patients with type 2 diabetes, it may lower fasting glucose and insulin resistance according to a meta-analysis of 6 studies [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Pistachios are rich in fiber and healthy fats while low in glycemic index, which slows sugar absorption.

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Milk Thistle (Silymarin)

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Take a 300 mg milk thistle (silymarin) supplement daily with water, preferably with a meal for better absorption. Continue this regimen as advised by your healthcare provider.

TYPICAL STARTING DOSE

300 mg

Description

Silymarin is a natural plant extract derived from the milk thistle plant (*Silybum marianum*). It has been traditionally used for its potential anti-inflammatory and liver-protective properties. Silymarin consists of several flavonolignans, including silybin, silydianin, and silychristin.

Milk thistle (*Silybum marianum*) is a purple flowering plant in the daisy family. Traditionally, it has been used for liver problems. Some people also eat the leaves in salads [\[R\]](#), [\[R\]](#).

The extract of milk thistle is called *silymarin* [\[R\]](#), [\[R\]](#), [\[R\]](#).

People use milk thistle to help with [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Liver problems
- Blood sugar control
- Indigestion
- Skin problems

How it helps

Supplementation with milk thistle extract (supplying 420-600 mg/day silymarin) for 1.5-4 months reduced fasting blood sugar, insulin, insulin resistance, and glycated hemoglobin in 2 placebo-controlled trials of 94 people with type 2 diabetes. In a non-placebo-controlled trial of 60 people with type 1 diabetes and alcoholic liver damage, silymarin (600 mg/day for 12 months) also reduced oxidative stress and insulin requirement [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

The combination of milk thistle extract with berberine improved blood glucose levels, insulin secretion, insulin resistance, and blood fat profile in 5 placebo-controlled trials of 143 healthy volunteers, 85 people with type 1 diabetes, 136 with type 2 diabetes, and 277 with dyslipidemia. A meta-analysis of these studies confirmed its benefits on blood glucose and fat profile [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

The combination of milk thistle, boswellia gum resin, and stinging nettle (1 capsule containing 200 mg of each extract, 3x/day) lowered fasting blood glucose and glycated hemoglobin in a 3-month placebo-controlled trial of 60 people with type 2 diabetes [\[R\]](#).

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Inositol

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take inositol as a daily supplement, usually available in powder or capsule form. The typical dosage ranges from 2 grams to 18 grams per day, divided into smaller doses taken with meals and water to aid absorption. It's important to start with a lower dose and gradually increase to avoid digestive side effects.

TYPICAL STARTING DOSE

2 g

Description

Inositol is a naturally occurring compound that plays a role in cell signaling and neurotransmitter function. It has been studied for its potential in promoting mental health and managing conditions like anxiety and depression when used as a supplement under the guidance of a healthcare professional.

Inositol is a type of sugar that our bodies need to function. It was considered a vitamin (vitamin B8) until it was discovered that our bodies can make it from another common sugar, glucose [\[R\]](#).

[Myo-inositol](#) is the most common form of inositol. It plays a role in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Heart health
- Normal blood sugar levels
- Mental health
- Cognitive function
- Reproductive health

Myo-inositol can convert to [D-chiro-inositol](#) in the body. These two forms of inositol are often combined in supplements. People use them to improve blood sugar control and PCOS [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

In 4 placebo-controlled trials of 706 healthy pregnant women, supplementation with myo-inositol (4 g/day) for up to 28 weeks reduced insulin resistance and gestational diabetes rates. The effect was strongest in overweight women, who are at highest risk [\[R\]](#), [\[R\]](#), [\[R\]](#).

A supplement with myo-inositol, chiro-inositol, folic acid, and manganese improved glycemic and blood fat parameters in a placebo-controlled trial of 24 healthy pregnant women [\[R\]](#).

In a placebo-controlled trial of 69 pregnant women with gestational diabetes, myo-inositol (4 g/day) combined with folic acid reduced fasting glucose and insulin levels, ultimately improving insulin resistance [\[R\]](#).

Myo-inositol (2-4 g/day) combined with folic acid and taken for 12-14 weeks reduced insulin levels and insulin resistance in 2 placebo-controlled trials of 70 overweight women with PCOS. but not in another one of 92 women with this condition. In 2 non-placebo-controlled trials of 152 pregnant women with PCOS, myo-inositol was more effective than metformin at preventing gestational diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

In a placebo-controlled trial of 80 women with metabolic syndrome, treatment with myo-inositol (4 g/day) for 12 months improved blood glucose, insulin resistance, and blood fat profile [\[R\]](#).

Myo-inositol mimics the effects of insulin and seems to enhance insulin sensitivity. Based on the studies so far, it seems better suited for overweight women [\[R\]](#).

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Brown rice

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Replace white rice with brown rice in your meals. Aim to consume brown rice 3-4 times a week, incorporating it into dishes such as stir-fries, salads, or as a side to your main protein source. Start with a serving size of about 1/2 to 1 cup of cooked brown rice per meal.

Description

Brown rice is a whole grain rich in fiber, vitamins, and minerals. It provides sustained energy, supports digestive health, and contributes to overall nutritional well-being.

Brown rice contains a host of B-vitamins including thiamine, and minerals like magnesium, phosphorus, manganese, and selenium. A ½ cup serving provides 0.1 mg of thiamine or 8%DV.

How it helps

Dietary fiber may help reduce blood sugar levels. **People who eat more fiber may be at a lower risk of diabetes** [\[R\]](#), [\[R\]](#), [\[R\]](#).

This is because **fiber delays the absorption of sugar**, which prevents blood sugar spikes. It may even boost your response to insulin [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Brown rice has a lower glycemic index than white rice, resulting in a slower rise in blood sugar levels post-consumption. **Note that a diet high in sugary foods may cancel out the protective effects of whole grains such as brown rice** [\[R\]](#).

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Aquatic Exercise

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Participate in aquatic exercise sessions, such as swimming or water aerobics, for 60 minutes, 3 to 5 times per week. Ensure the exercise intensity is moderate, allowing you to talk but not sing during the activity. Consistency over time is key, so aim to incorporate this into your weekly routine for at least 3 to 6 months to observe benefits.

TYPICAL STARTING DOSE

1 hour

Description

Aquatic exercise involves physical activity performed in water, such as swimming, water aerobics, or aquatic therapy. It is gentle on the joints, making it suitable for individuals with mobility issues, and can help improve cardiovascular fitness and muscle strength.

Aquatic exercise is any type of low-impact physical activity performed in a pool. In this type of cardio exercise, water helps the body float, which reduces gravity and makes the practice more comfortable and tolerable [\[R\]](#), [\[R\]](#).

Compared to land-based exercise, aquatic exercise may be better by [\[R\]](#):

- Reducing the stress and impact on joints
- Lowering fracture risk

Hence, it is usually **recommended for the elderly**. Aquatic exercise is also suitable for people who don't know how to swim [\[R\]](#).

How it helps

Exercise is a great way to control blood sugar levels. When you exercise, your muscles use up sugar for energy. Exercise also makes your cells more sensitive to insulin [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Interestingly, a trial of 10 healthy participants found aquatic exercise more effective than other types of exercise such as cycling or walking at lowering postprandial glucose. In people with type 2 diabetes, aquatic exercise may lower HbA1c levels according to a meta-analysis of 9 trials [\[R\]](#), [\[R\]](#).

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Yoga

IMPACT

3 / 5

EVIDENCE

3 / 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

Stress releases chemicals that are linked to high blood sugar levels. **Stress from work and trauma in particular may increase blood sugar** [\[R, R, R, R, R, R\]](#).

A meta-analysis of 14 studies and 834 participants found yoga interventions lasting 4-52 weeks effective at lowering fasting blood glucose, total and LDL cholesterol, triglycerides, and blood pressure in people with prediabetes Similarly, 4 meta-analyses (the most recent one with 23 studies and 2,473 participants) found yoga (for 0.5-9 months) effective at lowering blood glucose (fasting and post-meal) and HbA1c levels in people with type 2 diabetes [\[R, R, R, R, R\]](#).

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Ginkgo

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take 120 mg of Ginkgo supplement daily, preferably with meals to aid absorption. This dosage is typically split into two 60 mg doses taken in the morning and evening for best results.

TYPICAL STARTING DOSE

120 mg

Description

[Ginkgo](#) (*Ginkgo biloba*) is an ancient tree used in traditional Chinese medicine [\[R\]](#), [\[R\]](#).

According to limited evidence, ginkgo leaf extract may help with [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Anxiety
- Dementia
- Eye problems
- Blood vessel problems
- Vitiligo

How it helps

In 2 placebo-controlled trials of 92 people with type 2 diabetes or at risk of developing this condition, supplementation with ginkgo extract (120-240 mg/day) for 3-18 months improved glycemic control, measured as lower fasting glucose, insulin, and HbA1c levels. Ginkgo extract can increase the activity of the pancreatic cells that produce insulin (beta cells) without causing insulin resistance. Ginkgo extract also improved the effectiveness of the antidiabetic drug metformin in a placebo-controlled trial of 60 people [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Moreover, ginkgo extract reduced insulin resistance, oxidative damage, inflammation, and the risk and severity of complications such as heart, kidney, and eye damage in 6 trials (3 of them controlled) of 298 people with type 2 diabetes and 11 with metabolic syndrome [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

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Vitamin C

IMPACT

3 / 5

EVIDENCE

3 / 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

500 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

Three meta-analyses (the largest one with 28 studies and 1,574 participants) concluded that supplementation with vitamin C lowers HbA1c (by 0.54%) and fasting glucose (by 0.44 mmol/L), especially in people with type 2 diabetes and in interventions longer than 30 days [\[R\]](#), [\[R\]](#), [\[R\]](#).

However, vitamin C (both alone and combined with vitamin E) doesn’t improve insulin sensitivity according to a meta-analysis of 14 trials and 735 patients with type 2 diabetes [\[R\]](#).

Genetically lower vitamin C levels may raise the risk for hyperglycemia and metabolic syndrome [\[R\]](#).

Please note: *Supplementing with vitamin C is linked to a slightly higher risk of kidney stones in men. Talk to your doctor before taking vitamin C* [\[R\]](#), [\[R\]](#).

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Magnesium

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take up to 350 mg of magnesium daily as a supplement, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

250 mg

Description

Magnesium is an essential mineral involved in various bodily functions, including muscle contractions, nerve signaling, and bone health. Maintaining adequate magnesium levels through diet or supplements can support overall well-being and reduce the risk of magnesium deficiency-related health issues.

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

- Muscle, nerve, and bone function
- Blood sugar and blood pressure control
- DNA and protein production
- Strong immunity

Women need **310-320 mg** of magnesium per day, while men need **400-420 mg** [\[R\]](#).

Foods rich in magnesium include **nuts, seeds, and leafy greens**. Magnesium is also available as a supplement [\[R\]](#).

How it helps

Magnesium may help control blood sugar by supporting the effects of insulin. **Higher magnesium intake is linked to lower blood sugar** [\[R\]](#), [\[R\]](#).

Supplementing with magnesium (250-350 mg/day for 4-16 weeks) may lower blood sugar and insulin levels. It may also improve insulin resistance [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Magnesium may reduce blood sugar more in people with your [SLC30A8](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
SLC30A8	rs11558471	AA	

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Betaine (TMG)

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

To take Betaine (TMG) as a supplement, consume 500-2000 mg daily, preferably with a meal to enhance absorption. It is recommended to start at the lower end of the dosage range and adjust based on personal tolerance and effectiveness. This supplement can be taken indefinitely for ongoing support of heart health and liver function.

TYPICAL STARTING DOSE

500 mg

Description

Betaine is a compound found in various foods and used in dietary supplements for its potential to support liver health and contribute to healthy homocysteine levels.

How it helps

In a study with 2,396 heart patients, those with diabetes had more than three times higher urinary betaine levels [\[R\]](#).

A meta-analysis of 46 studies revealed that higher betaine levels were associated with a reduced risk of type 2 diabetes [\[R\]](#), [\[R\]](#).

A large prevention trial involving 5,613 participants with overweight and metabolic syndrome found that increasing dietary choline or betaine intake led to improved blood sugar levels and other positive changes. The greatest improvement was seen with a one-year increase in intake [\[R\]](#).

In a 12-week trial with 27 individuals having obesity and prediabetes, betaine supplementation (3,300 mg, 2x/day for 10 days, then 4,950 mg, 2x/day for 12 weeks) lowered fasting glucose levels but increased total cholesterol [\[R\]](#).

Genetically higher betaine levels may be linked to lower odds of type 2 diabetes [\[R\]](#).

In summary, betaine shows promise for managing diabetes risk and metabolic health when included in the diet, and supplementation may lead to benefits such as improved blood sugar control, although its impact on cholesterol levels may vary.

Please note: *Doses above 4 g/day may increase LDL and triglyceride levels. TMG supplementation can cause a person’s urine and sweat to smell fishy* [\[R\]](#), [\[R\]](#).

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Probiotics

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take a probiotic supplement containing 10 billion or more live cultures once daily, preferably with a meal or as directed by the packaging or a healthcare provider.

TYPICAL STARTING DOSE

10 billion

Description

Probiotics are live beneficial bacteria and yeasts that can support gut health and digestive function when consumed as supplements or found in fermented foods like yogurt and sauerkraut. They may be beneficial to gut health, immune function, blood sugar, and mood.

Probiotic bacteria are “good” bacteria found mainly in the large intestine. They support your body and mind by [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Maintaining gut health
- Supporting a healthy immune system
- Improving your mood
- Helping to maintain healthy blood sugar

Prebiotics are certain types of fiber and other complex carbs that serve as food for gut bacteria. **They support gut health by helping boost the activity and growth of “good” bacteria** [\[R\]](#), [\[R\]](#).

Prebiotics are also added to foods and supplements. Common prebiotic ingredients are [\[R\]](#), [\[R\]](#):

- Oligo-fructose
- Oligo-galactose
- [Inulin](#)

Mixtures of probiotics and prebiotics are known as **synbiotics** [\[R\]](#).

How it helps

Probiotics may reduce blood sugar levels and improve insulin resistance [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Probiotics likely influence blood sugar by [\[R\]](#):

- Boosting beneficial gut bacteria
- Supporting gut function
- Lowering inflammation

A healthy gut helps your body use sugar by making it more sensitive to insulin [\[R\]](#).

The following probiotics may help [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- [L. acidophilus](#)
- [L. casei](#)
- [L. rhamnosus](#)
- [B. breve](#)
- [B. longum](#)
- [B. animalis](#)



PERSONALIZED TO YOUR GENES

[HLA-C](#) and other *HLA* genes help make immune proteins involved in various autoimmune conditions, including type 1 diabetes. According to limited research, HLA-associated inflammation may impair [blood sugar](#) control [\[R\]](#), [\[R\]](#), [\[R\]](#).

Your genotype for [rs2844623](#) ('CC'; *homozygous major*) has been correlated with higher blood sugar levels — possibly due to increased HLA activity [\[R\]](#).

[Probiotics](#) may improve different inflammatory conditions, partly due to their ability to inhibit HLA proteins [\[R\]](#), [\[R\]](#), [\[R\]](#).

>>> To learn more about the link between the *HLA* genes and blood sugar, check out the full SelfDecode blog post [here](#).

Your [TNF](#) gene variant is linked to diabetes. This gene helps make TNF, a major inflammatory protein. Probiotics may help by reducing TNF levels and inflammation [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
HLA-C	rs2844623	CC	

GENE	SNP	GENOTYPE	EVIDENCE
TNF	rs2857605	TC	

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Apple Cider Vinegar

IMPACT3 / 5

EVIDENCE2 / 5

How to implement

Incorporate 1-2 tablespoons of apple cider vinegar into your diet daily by diluting it in a large glass of water. Consume this mixture before meals to potentially benefit from its effects.

Description

Apple cider vinegar is a fermented liquid made from crushed apples and is known for its potential health benefits. It is rich in acetic acid and may aid in weight management, improve digestion, and help regulate blood sugar levels, often used as a natural remedy for various conditions like acid reflux and insulin resistance.

[Vinegar](#) is often used in cooking to add sour flavor and to preserve foods through pickling. Some people also use vinegar for cleaning [\[R\]](#).

Apple cider vinegar is one of the most common vinegars produced from apples. As a health food, apple cider vinegar may help [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Reduce blood sugar
- Lower cholesterol
- Fight infections

How it helps

Vinegar (2-50 g) may reduce blood sugar spikes after a meal. It does so by making you more sensitive to insulin [\[R\]](#), [\[R\]](#), [\[R\]](#).

In people with diabetes, vinegar may also help with long-term blood sugar control [\[R\]](#).

Apple cider vinegar (20 mL/day) seems to be the best type of vinegar for this purpose [\[R\]](#), [\[R\]](#), [\[R\]](#).

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Vinegar

IMPACT

3 / 5

EVIDENCE

2 / 5

How to implement

Incorporate 1-2 tablespoons of vinegar into your diet daily, either by using it as a salad dressing or by diluting it in a glass of water. It is important to not exceed this amount to avoid adverse effects.

Description

Vinegar is a liquid produced through fermentation, often used in cooking and as a condiment. It may have health benefits such as aiding digestion and potentially helping with blood sugar control in some individuals due to its acetic acid content.

[Vinegar](#) is often used in cooking to add sour flavor and to preserve foods through pickling. Some people also use vinegar for cleaning.

As a health food, vinegar may help [\[R\]](#), [\[R\]](#):

- Reduce blood sugar
- Control weight

How it helps

Vinegar (2-50 g) may reduce blood sugar spikes after a meal. It does so by making you more sensitive to insulin [\[R\]](#), [\[R\]](#), [\[R\]](#).

In people with diabetes, vinegar may also help with long-term blood sugar control [\[R\]](#).

Apple cider vinegar (20 mL/day) seems to be the best type of vinegar for this purpose [\[R\]](#), [\[R\]](#), [\[R\]](#).

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Vanadium

IMPACT

3 / 5

EVIDENCE

2 / 5

Description

Vanadium is a trace mineral that is found in small amounts in many foods. It is important for bone health, blood sugar control, and cholesterol levels. Vanadium may also help to protect against cancer and heart disease.

How it helps

Supplementation with vanadyl sulfate (100 mg/day for 3-6 weeks) improved fasting glucose, HbA1c, and hepatic and peripheral insulin sensitivity in placebo-controlled trials of 41 patients with non-insulin-dependent diabetes. However, it failed to improve insulin sensitivity in a placebo-controlled trial of 14 obese patients with impaired glucose tolerance. Similarly, it failed to enhance insulin action in another trial on type 1 diabetic patients [R, R, R, R, R, R].

Similarly, vanadium-enriched yeast supplementation (0.9 mg/day vanadium pentoxide) for 12 weeks improved anthropometric indices and glycemic parameters in a placebo-controlled trial of 44 obese type 2 diabetes patients [R].

Moreover, a systematic review of 170 trials and 14223 participants with type 2 diabetes identified vanadium as the most effective supplement to lower total cholesterol [R].

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Banaba

IMPACT

3 / 5

EVIDENCE

2 / 5

How to implement

Take 32-48 mg of a standardized banaba extract containing 1% corosolic acid, once daily with water. It is best taken with a meal for optimal absorption and effectiveness. Continue this supplementation for at least 2 weeks to potentially begin observing benefits such as improved blood sugar levels.

TYPICAL STARTING DOSE

32 mg

Description

Banaba, a plant traditionally used in herbal medicine, is believed to have potential benefits for blood sugar management and weight control. It is used in various dietary supplements and herbal remedies.

How it helps

In 5 clinical trials of 98 people with poorly-controlled type 2 diabetes and 68 healthy volunteers, supplementation with banaba extract (16-100 mg/day) lowered blood glucose (by 13.5-30%) without causing hypoglycemia [R, R, R].

Its active component corosolic acid (10 mg/day) reduced post-meal blood glucose in a placebo-controlled trial of 31 healthy volunteers [R].

In a placebo-controlled trial of 80 people at high risk of diabetes, a product combining banaba extract and cinnamon bark improved insulin sensitivity [R].

Banaba leaf may help by increasing glucose tolerance. It can decrease glucose production in the body up to 30% and reduce the breakdown of storage molecules (like starch and glucagon) into glucose [R].

64



Broccoli

IMPACT

3 / 5

EVIDENCE

2 / 5

How to implement

Incorporate at least one cup of chopped broccoli, either steamed or raw, into your daily diet. This can be as part of a meal or snack. Continue this practice daily for ongoing health benefits.

Description

Broccoli and broccoli sprouts are nutrient-dense vegetables packed with vitamins, minerals, and antioxidants. They are known for their potential to support a healthy immune system, protect against chronic diseases, and promote overall nutritional wellness.

Broccoli is high in vitamin K and C, as well as a number of other vitamins and minerals, and antioxidants like quercetin. A ½ cup serving provides 110 mcg of vitamin K or 92%DV.

How it helps

A meta-analysis found consistent evidence that broccoli consumption lowers blood glucose. In line with this, consuming broccoli sprout powder (10 g/day) lowered insulin resistance and insulin levels in a placebo-controlled trial of 81 patients with type 2 diabetes [R, R].

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Avoid Air Pollution

IMPACT

2 / 5

EVIDENCE

3 / 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

Air pollution may raise blood sugar by causing [oxidative stress](#) and inflammation [\[R\]](#), [\[R\]](#), [\[R\]](#).

People who live in areas with air pollution are more likely to have high blood sugar. This risk increases the longer you’re exposed to air pollution [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

There are many strategies that may lower your exposure to air pollution. When air pollution is high, you may want to [\[R\]](#):

- Stay indoors
- Keep windows closed
- Use air purifiers
- Wear a well-fitting mask outdoors

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Aloe Vera

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Take a 50 mg Aloe vera supplement daily, with a glass of water, preferably at the same time each day to maintain consistency.

TYPICAL STARTING DOSE

50 mg

Description

Aloe vera is a succulent plant native to arid regions and contains a gel-like substance in its leaves that is rich in vitamins, minerals, and antioxidants, making it beneficial for soothing skin irritations, promoting wound healing, and providing relief from conditions such as sunburn and minor burns. The primary active compounds in aloe vera gel include polysaccharides, vitamins like vitamin C and E, and minerals such as zinc, which contribute to its healing and anti-inflammatory effects.

[Aloe vera](#) lives in the desert, and its thick leaves store water in the form of a gel [\[R\]](#).

People use aloe gel to help soften the skin and soothe burns [\[R\]](#).

Oral aloe supplements may help with blood sugar and gut health [\[R\]](#).

How it helps

Aloe vera may help muscle cells remove sugar from the bloodstream [\[R\]](#).

Pills with aloe extract (0.3-1.4 g/day for 6-12 weeks) may help reduce blood sugar [\[R\]](#), [\[R\]](#), [\[R\]](#).

However, health experts say there’s not enough evidence to recommend aloe supplements for diabetes [\[R\]](#).

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Intermittent Fasting

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Limit your daily eating to a specific window of time, typically within an 8-hour period such as from 12 pm to 8 pm, and fast for the remaining 16 hours of the day. Repeat this daily or for at least 3-4 days per week.

Description

Intermittent fasting is an eating pattern that involves cycling between periods of fasting and eating. It may help with weight management, improve metabolic health, and offer potential benefits for certain health conditions when done under proper guidance.

Intermittent fasting (IF) is a pattern of eating that alternates between periods of eating and fasting. The most popular IF method is called the 16/8 method, where you fast for 16 hours and eat during an 8-hour window.

People mainly practice IF to lose weight. Besides benefits related to weight reduction, IF may help lower the risk of [\[R\]](#):

- Alzheimer's disease
- Joint pain
- Asthma
- Multiple sclerosis
- Stroke

Some types of intermittent fasting, such as Ramadan fasting, are also practiced for religious reasons.

How it helps

In an uncontrolled trial of 8 healthy men, intermittent fasting increased sugar uptake from the blood in response to insulin [\[R\]](#).

A meta-analysis of 72 studies and 3,134 participants found that Ramadan intermittent fasting modestly improves fasting glucose, insulin levels, and insulin resistance in healthy people [\[R\]](#).

In 3 non-placebo-controlled trials of 81 people at risk of developing type 2 diabetes due to excess weight, intermittent fasting improved blood sugar control and insulin sensitivity [\[R, R, R\]](#).

In 2 non-placebo-controlled trials of 104 people with type 2 diabetes, intermittent fasting improved fasting glucose, HbA1c, weight loss, and quality of life. However, these improvements were non-significant in another trial of 32 people. Moreover, a 24-month non-placebo-controlled trial of 137 people found that weight loss was maintained but HbA1c increased in the long term [\[R, R\]](#).

In a non-placebo-controlled trial of 70 people with metabolic syndrome, both intermittent and continuous calorie restriction were similarly effective at improving parameters such as fasting glucose, insulin, HbA1c, insulin resistance, blood fat profile, and blood pressure [\[R\]](#).



PERSONALIZED TO YOUR GENES

The [PPARG](#) gene codes for [PPAR-gamma](#) 1 and 2, proteins that control [sugar](#) and fat metabolism. Excess PPAR-gamma2 activity in fat cells may lead to an accumulation of fatty acids, potentially contributing to [insulin resistance](#) and elevated blood sugar [[R](#), [R](#), [R](#), [R](#)].

Your genotype for [rs1801282](#) has been associated with relatively higher blood sugar levels and type 2 diabetes rates. It may increase PPAR-gamma2 activity in fat tissue [[R](#), [R](#), [R](#), [R](#)].

Fasting and calorie restriction may counteract your variant by reducing PPAR-gamma2 activity in fat cells [[R](#), [R](#), [R](#)].

>>> To learn more about the link between the *PPARG* gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
PPARG	rs1801282	CC	



Spirulina



How to implement

Take 1-8 g of spirulina supplements daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE
500 mg

Description

Spirulina is a blue-green algae. It is rich in nutrients like protein, vitamins, and minerals, particularly vitamin B12 and iron, and is a source of antioxidants, chlorophyll, and phycocyanin. It can be found in powdered or tablet form as a supplement, and is often used to boost energy, support the immune system, and enhance overall nutrition. Additionally, spirulina.

[Spirulina](#) is a supplement made from blue-green algae that grows in fresh and marine water [[R](#), [R](#)].

Dried spirulina is up to 70% protein. It’s also rich in vitamins, antioxidants, and healthy fats. This makes it a great source of nutrition for both people and livestock [[R](#), [R](#), [R](#)].

People use spirulina supplements to reduce [[R](#), [R](#)]:

- Cholesterol
- Blood pressure
- Blood sugar

How it helps

A meta-analysis of 12 trials and 646 participants concluded that supplementation with spirulina (1-19 g/day) for 2-48 weeks may significantly improve fasting blood glucose, insulin resistance, and blood fat profile in both healthy people and those suffering from type 2 diabetes. Spirulina (0.8-8 g/day) may have similar effects in people with metabolic syndrome according to another meta-analysis of 14 studies and 650 people [[R](#), [R](#)].

However, 12 weeks of spirulina tablets (8 g/day) didn’t affect blood sugar levels in a non-placebo-controlled trial of 37 people with type 2 diabetes [[R](#)].

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Resveratrol

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Take 150-500 mg of resveratrol as a supplement daily, preferably with meals to enhance absorption. This dosage range is based on studies for various health benefits, and it's advised to not exceed 500 mg per day without medical supervision.

TYPICAL STARTING DOSE

150 mg

Description

Resveratrol is a natural compound found in red grapes, red wine, and some berries. It is known for its potential antioxidant properties and its role in promoting heart health.

[Resveratrol](#) is an antioxidant found mainly in [\[R\]](#):

- Berries
- Red grapes
- Red wine
- Peanuts

It’s purported to have anti-inflammatory and antioxidant effects [\[R, R, R\]](#).

How it helps

A meta-analysis of 11 studies and 388 participants concluded that supplementation with resveratrol may improve blood glucose control and insulin sensitivity in people with type 2 diabetes, but not in healthy individuals. However, the most recent Cochrane review (3 studies and 50 participants) found the evidence insufficient to support this use of resveratrol [\[R, R\]](#).

Another meta-analysis (10 studies) concluded that supplementation with at least 500 mg/day of resveratrol for over 10 weeks lowers blood sugar levels and waist circumference in people with metabolic syndrome [\[R\]](#).

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Chromium

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Take a 200 mcg chromium supplement daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

200 mcg

Description

Chromium is a trace mineral that plays a role in insulin sensitivity and glucose metabolism. Adequate chromium intake through diet or supplements may help support blood sugar control and overall metabolic health.

[Chromium](#) (Cr) is a trace element. It helps regulate carb, fat, and protein breakdown [\[R\]](#).

Women need 20-25 micrograms (mcg) of chromium per day, while men need 30-35 mcg [\[R\]](#).

It’s easy to get chromium from your diet. Good sources include [\[R\]](#):

- Grape and orange juice
- Ham
- Beef
- Lettuce

You can also get chromium from supplements [\[R\]](#).

How it helps

Four meta-analyses (with a maximum of 14 trials and 875 participants) concluded that chromium (42-1,000 µg/day for 1-4 months), both alone or in different combinations, can significantly improve fasting blood glucose and HbA1c in people with type 2 diabetes. Chromium picolinate showed the best results for glycemic control in one meta-analysis but another one found that only brewer’s yeast lowers fasting blood glucose [\[R, R, R, R\]](#).

However, a meta-analysis of 16 studies and 809 participants (both diabetic and non-diabetic) concluded that chromium may provide no benefits in people who are not deficient in this micronutrient [\[R\]](#).

A meta-analysis of 20 studies and 618 participants found no effects of chromium supplementation in non-diabetics [\[R\]](#).

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Coenzyme Q10 (CoQ10)

IMPACT2 / 5

EVIDENCE3 / 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

CoQ10 (100-200 mg/day for up to 12 weeks) may reduce high blood sugar and insulin [\[R\]](#), [\[R\]](#).

CoQ10 may help by reducing [oxidative stress](#), which plays a role in diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#).

Note that CoQ10 is fat-soluble. This means that **taking it with a fatty meal should help you absorb it better** [\[R\]](#).

Please note: *CoQ10 may reduce the effectiveness of blood thinners such as warfarin. Talk to your doctor before taking CoQ10* [\[R\]](#).

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Genistein

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Take a genistein supplement daily, with a usual dosage range between 30 mg to 100 mg. It is best taken with food to enhance absorption. Continue this regimen daily for at least six months to evaluate its benefits fully.

TYPICAL STARTING DOSE
30 mg

Description

Genistein is an isoflavone found in soy products that may offer potential health benefits, including antioxidant and anti-inflammatory properties. It has been studied for its potential role in hormone regulation and the reduction of certain cancer risks.

How it helps

A meta-analysis of 7 trials and 670 postmenopausal women found that genistein significantly reduced fasting glucose levels, fasting insulin concentrations, and insulin resistance. Another meta-analysis (11 studies) found notable improvements in insulin resistance, especially in women who were not obese and had no metabolic disorders. Genistein also improved fasting glucose and insulin. According to another meta-analysis, genistein lowers fasting glucose by 7.15 mg/dL, insulin by 1.37 mIU/mL, and insulin resistance by 0.39 [\[R, R, R\]](#).

73



Walking

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Incorporate at least 30 minutes of brisk walking into your daily routine, aiming for a minimum of five days a week. This can be done in one continuous session or broken into shorter periods, such as three 10-minute walks throughout the day.

TYPICAL STARTING DOSE
30 minutes

Description

Walking is a low-impact form of exercise that can contribute to cardiovascular fitness, weight management, and improved overall health. It is used to support physical activity goals, enhance mood, and promote better cardiovascular health.

How it helps

A meta-analysis of 20 trials and 866 type 2 diabetes patients showed that walking lowered HbA1c by 0.50%. Both supervised walking and non-supervised with motivational strategies were effective. Walking also reduced BMI and diastolic blood pressure. Another meta-analysis (37 trials and 2001 participants) found beneficial effects of walking on 7 different cardiovascular risk factors, including fasting glucose [\[R, R\]](#).

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Avoid Arsenic Exposure

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Use a water filter certified to remove arsenic if you rely on well water, opt for arsenic-tested rice or rice products, and avoid using contaminated pesticides or herbicides in gardening or farming. Test your home for arsenic if you live in an area known for high levels of arsenic in soil or water. Limit consumption of foods known to accumulate arsenic such as rice and rice-based products, especially if you are pregnant, nursing, or preparing meals for young children.

Description

Avoiding arsenic exposure is essential for preventing potential health risks associated with arsenic contamination in drinking water and foods. Chronic exposure to arsenic has been linked to various health issues, including cancer and cardiovascular problems.

Arsenic is a [heavy metal](#) naturally found in the environment. It is used for mining, fracking, and industrial applications, such as the production of pesticides and wood preservatives, and the use of fossil fuels [\[R\]](#).

The main sources of exposure to arsenic are contaminated [\[R\]](#), [\[R\]](#), [\[R\]](#):

- **Drinking water**
- **Rice** and fish
- Air

Long-term exposure to high amounts of arsenic may be linked to health problems, including [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Skin disorders
- Heart disease
- High blood pressure
- Stroke
- Diabetes
- Cancer

Please note: *Soaking, washing until clear, and cooking rice with a high (1:6) water-to-rice ratio may help reduce rice’s arsenic content* [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

A meta-analysis of 32 studies associated arsenic ingestion with a 57-71% higher risk of diabetes. Another meta-analysis (7 studies and over 2M participants) found 23% higher risk of diabetes in people ingesting arsenic with drinking water. The risk increased by 13% for every 100 µg/L increment. Similarly, a study found a dose-dependent relationship between arsenic in drinking water or urinary arsenic levels and type 2 diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#).

A meta-analysis of 10 studies found a moderate association (56% higher risk) between arsenic exposure and gestational diabetes [\[R\]](#).

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Brewer's Yeast

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Take 1 to 2 tablespoons of brewer's yeast daily, mixing it into water, juice, smoothies, or food. It can be consumed at any time of day, but incorporating it into a regular, daily routine ensures consistent intake. Continuation can be long-term if it agrees with your system and you're seeing desired outcomes.

Description

Brewer's yeast is a nutritional supplement rich in B vitamins, minerals, and protein. It's often used to support energy levels, boost metabolism, and promote overall health, particularly for individuals with dietary restrictions or specific nutritional needs.

Brewer’s yeast is a great source of B-vitamins and minerals like chromium, iron, zinc, and selenium. A 1 tablespoon serving provides 3.3 mcg of chromium or 9%DV.

How it helps

Brewer's yeast (10 g/day for 12 weeks) reduced blood glucose and insulin levels after an oral glucose load test in a placebo-controlled trial of 22 healthy volunteers [\[R\]](#).

A meta-analysis of 14 trials and 875 participants concluded that brewer’s yeast (but not other forms of chromium supplementation) reduces fasting blood glucose in people with type 2 diabetes [\[R\]](#).

76



Green Tea Extract

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Take a green tea extract supplement containing 250-500 mg of EGCG (the active compound in green tea) daily, preferably with a meal to enhance absorption. This dosage is typically split into two separate doses, taken in the morning and later in the day. Continue this regimen for at least three months to observe potential health benefits.

TYPICAL STARTING DOSE
250 mg

Description

Green tea extract is a concentrated form of the beneficial compounds found in green tea, such as catechins. It is used in dietary supplements for its potential to enhance metabolism, aid in weight management, and provide antioxidant protection.

[Green tea](#) is made from the same plant as black tea (*Camellia sinensis*). However, the leaves and buds are processed differently [\[R\]](#).

Green tea contains **catechins**. These are antioxidants that help prevent [oxidative stress](#) [\[R\]](#).

EGCG is the main catechin found in green tea. It may help reduce inflammation and support weight loss [\[R\]](#).

How it helps

A meta-analysis of 17 trials concluded that green tea extract lowers fasting glucose and HbA1c levels [\[R\]](#).

Polyphenols in green tea may improve blood sugar control.

Please note: polyphenols from green tea 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 green tea [\[R\]](#).

77



Decaffeinated Coffee

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Replace your regular coffee intake with decaffeinated coffee. Aim to consume it in the same quantities and at the same times you would normally drink caffeinated coffee. This adjustment can be made indefinitely to reduce caffeine intake without altering your routine significantly.

Description

Decaffeinated coffee allows individuals to enjoy the flavor and aroma of coffee without the stimulating effects of caffeine, making it a suitable choice for those who are sensitive to caffeine or want to reduce their intake. It can still provide antioxidants and potential benefits like improved alertness.

How it helps

A meta-analysis of 28 studies found a dose-dependent inverse association between coffee consumption (both caffeinated and decaffeinated) and type 2 diabetes. Similarly, every additional cup of both caffeinated and decaffeinated coffee reduces the risk by 7% according to a meta-analysis of 18 studies [\[R\]](#), [\[R\]](#).

Another meta-analysis concluded that decaffeinated coffee (510.6 mg CGA) reduces fasting blood glucose and other metabolic syndrome parameters [\[R\]](#).

In a study of 17 men, decaffeinated coffee led to higher insulin sensitivity compared to water, while regular coffee with sugar had no significant impact on glucose, insulin, or incretin hormones [\[R\]](#).

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.

78

Avoid Pesticide Exposure

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

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.

Description

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.

Pesticides include all chemicals used to kill weeds, insects, fungi, and microbes. They are widely used in agriculture to improve crop yields. Common groups of pesticides include:

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

Chronic exposure to pesticides has been linked to:

- Fertility problems [\[R\]](#)
- Cognitive problems [\[R\]](#)
- Alzheimer’s and Parkinson’s disease [\[R\]](#), [\[R\]](#)
- Thyroid problems [\[R\]](#)
- Obesity [\[R\]](#)
- DNA damage and cancer [\[R\]](#), [\[R\]](#), [\[R\]](#)

How it helps

A meta-analysis of 22 studies found a significant association between pesticides and diabetes, with an increased risk of 58% for high vs. low exposure. Type 2 diabetes showed a similar risk (61%) with no heterogeneity. Specific pesticides like DDE, heptachlor, HCB, DDT, and trans-nonachlor/chlordane increased diabetes risk [\[R\]](#).

Exposure to p,p'-DDE, a breakdown product of p,p'-DDT, is associated with a slightly increased risk of type 2 diabetes and hypertension at low levels, based on 23 prospective studies [\[R\]](#).

Pesticides can disrupt your endocrine system, potentially causing insulin resistance and leading to higher blood sugar levels.

79



Curcumin

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Take a 500 mg curcumin supplement daily with food. To enhance absorption, take it with a meal that contains fats or oils since curcumin is fat-soluble.

TYPICAL STARTING DOSE
500 mg

Description

Curcumin is a compound found in turmeric known for its anti-inflammatory and antioxidant properties. It has been studied for its potential to reduce inflammation, support joint health, and contribute to overall well-being.

[Turmeric](#) is a yellow spice from India. It may reduce inflammation and [oxidative stress](#) [R].

The most important active compound in turmeric is **curcumin**. People use curcumin for [R, R, R, R, R, R]:

- Joint pain
- Hay fever
- Mood
- High blood sugar
- Gut health
- Liver health

How it helps

Curcumin (up to 4 g/day for 4-12 weeks) may lower blood sugar and improve insulin resistance [R, R, R, R, R].

Curcumin may help by [R, R]:

- Protecting against oxidative stress
- Lowering inflammation

Note that curcumin is hard to absorb. Look for supplements with *bioavailable* curcumin, which is easier to absorb. Combining it with [piperine](#) (a compound in black pepper) may also help [R, R].

Health experts say there’s not enough evidence to recommend curcumin supplementation for diabetes [R].

Please note: *curcumin may interfere with iron absorption due to its iron-chelating properties, potentially exacerbating anemia or making it harder to manage. If you have anemia, consult your healthcare provider before using curcumin or turmeric supplements* [R, R, R].

 PERSONALIZED TO YOUR GENES

The [BCL2](#) gene helps make a protein that controls cell death. It may improve blood sugar control by preventing [insulin resistance](#) and the death of pancreatic cells [[R](#), [R](#)].

Your genotype for [rs12454712](#) may reduce BCL2 activity. It’s been associated with higher [blood sugar](#) levels [[R](#)].

[Curcumin](#), the active ingredient in turmeric, may boost BCL2 activity [[R](#), [R](#)].

>>> To learn more about the link between the *BCL2* gene and blood sugar, check out the full SelfDecode blog post [here](#).

GENE	SNP	GENOTYPE	EVIDENCE
BCL2	rs12454712	TT	

80



Oats

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Incorporate oats into your diet daily by having them for breakfast as oatmeal, or adding them to smoothies, baking recipes, or overnight oats. Aim for at least a half-cup (40 grams) of dry oats to reap the health benefits.

Description

Oats are a whole grain known for their high fiber content and nutritional value, like zinc, iron, and manganese. Including oats in one's diet can promote heart health, stabilize blood sugar levels, and provide sustained energy.

Oats are a good source for manganese, zinc, iron, magnesium, and vitamins B1 and B5. A ½ cup serving provides 0.7 mg of manganese or 30%DV.

How it helps

Three meta-analyses (the largest one with 59 trials) found that oats interventions (20-136 g/day) decrease fasting glucose, fasting insulin, HbA1c, and glucose AUC [[R](#), [R](#), [R](#)].

A meta-analysis of 14 studies found that oats intake reduces HbA1c (by 0.42%), fasting glucose (by 0.39 mmol/L), total cholesterol (by 0.49 mmol/L), and LDL cholesterol (by 0.29 mmol/L) in diabetic patients [[R](#)].

Whole grains or thick flakes may be better than thin or instant flakes for lowering postprandial blood glucose according to a systematic review of 10 studies [[R](#)].

How to implement

Description

Water is essential for life. It supports nearly every process in your body [R].

- Energy and performance levels
- Brain function
- Gut function
- Healthy weight

How it helps

A meta-analysis of 6 studies associated water intake with 6% lower risk of type 2 diabetes. Similarly, a meta-analysis of 15 studies found probable beneficial effects of drinking water on glycemic parameters [R, R].

82



Extra Virgin Olive Oil (EVOO)

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Incorporate 1-2 tablespoons of extra virgin olive oil into your daily diet. Use it as a dressing for salads, vegetables, or incorporate it into cooking, but avoid using it at high temperatures to preserve its health benefits.

Description

Extra virgin olive oil is a high-quality olive oil obtained from the first pressing of olives. It is rich in monounsaturated fats and antioxidants, like polyphenols, and is associated with various health benefits, including heart health and anti-inflammatory properties.

[Olive oil](#) is fat from the olive, a traditional tree of the Mediterranean Basin [\[R\]](#).

Olive oil has anti-inflammatory and antioxidant properties. It may also reduce the risk of [\[R\]](#), [\[R\]](#):

- Heart disease
- Diabetes
- Cancer

Olive oil is also the primary fat source in the [Mediterranean diet](#), which may improve brain and heart health [\[R\]](#).

How it helps

A meta-analysis of 4 trials associated high dietary olive oil intake with a 16% reduced risk of type 2 diabetes. Extra virgin olive oil lowers insulin and insulin resistance according to a meta-analysis of 39 trials. However, another meta-analysis only found non-significant effects of extra virgin olive oil on glycemic control [\[R\]](#), [\[R\]](#), [\[R\]](#).

 PERSONALIZED TO YOUR GENES

The [TNF](#) gene helps make [TNF-alpha](#), a key inflammatory protein. Increased blood levels of TNF-alpha are closely linked to [insulin resistance](#) and may even directly increase blood sugar [\[R\]](#), [\[R\]](#), [\[R\]](#).

Your genotype for [rs2857605](#) has been associated with increased [blood sugar](#). It may increase TNF-alpha production, leading to insulin resistance [\[R\]](#), [\[R\]](#).

[Olive oil](#) consumption may reduce TNF-alpha levels after meals. Including olive oil in the diet may reduce the odds of type 2 diabetes by up to 16%. Experts recommend the Mediterranean diet, which uses olive oil as its main source of fat, to improve blood sugar control [\[R\]](#), [\[R\]](#), [\[R\]](#).

>>> To learn more about the link between the TNF gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TNF	rs2857605	TC	

83



Cocoa

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Incorporate 30-60 grams of high-quality dark chocolate (with at least 70% cocoa content) into your daily diet. Enjoy it as a snack or dessert to reap the potential heart health benefits.

Description

[Cocoa](#) comes from the beans of the *Theobroma cacao* tree. It is found any many foods and drinks, and people have also used it as a medicine for thousands of years. The numerous active components of cocoa can help with weight control, fatigue, mood, and digestion, among others.

[Cocoa](#) comes from the beans of the *Theobroma cacao* tree. It’s often used for making chocolate, hot chocolate, and pastries. People have also used it as a medicine for over a thousand years [\[R\]](#), [\[R\]](#).

Cocoa contains many active components that likely help [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Control weight
- Lower fatigue
- Boost mood
- Improve digestion
- Balance blood sugar
- Support heart health

Note that pure cocoa is likely a healthier choice than chocolate. If you eat chocolate, choose dark chocolate with more cocoa and less sugar and fat.

How it helps

In a meta-analysis of 8 RCTs with 433 diabetic patients, cocoa/dark chocolate consumption significantly reduced LDL cholesterol levels by 15.49 mg/dl and fasting blood sugar by 6.88 mg/dl [\[R\]](#).

In a review of 19 studies with 1131 participants, cocoa flavanol intake (166-2110 mg/d, 2-52 weeks) significantly improved insulin sensitivity and lipid profile. Various biomarkers showed specific changes [\[R\]](#).

In 12 trials (9 long-term and 3 short-term), cocoa products significantly reduced LDL cholesterol (-9.955 mg/dL), triglycerides (-15.364 mg/dL), blood glucose (-9.105 mg/dL), and C-reactive protein (-0.978 mg/L) in long-term use [\[R\]](#).

Cocoa contains flavonoids that may improve insulin sensitivity, helping your body to better manage high blood sugar levels. It also has anti-inflammatory properties which can reduce the damage high blood sugar does to your body.

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Bilberry

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Incorporate bilberry fruits into your diet by eating a small handful, approximately 1/4 to 1/2 cup, daily. You can also consume bilberry in the form of tea, by steeping 1-2 teaspoons of dried bilberries in hot water for about 10 minutes, up to three times a day.

Description

Bilberry is a fruit rich in antioxidants and flavonoids, which may contribute to eye health and circulatory function. It's often used in supplements for its potential to support vision and overall well-being.

How it helps

Consuming bilberry fruits (300-400 g/day) and extracts (0.47-1.5 g/day) for 8-12 weeks lowered blood glucose in 2 non-placebo-controlled trials of 173 people with or at risk of type 2 diabetes. Bilberries also increased insulin release and sensitivity, and reduced glucose and insulin spikes after meals [R, R].

Similarly, a cup of berries (150 g) or 1-2 glasses of juice reduced sugar, insulin, and GLP-1 spikes after eating a carbohydrate-rich meal in 4 non-placebo-controlled trials of 92 healthy people [R, R, R, R].

In an uncontrolled trial of 36 healthy people, consuming 150 g frozen bilberries 3x/week for 6 weeks lowered blood glucose [R].

Bilberry's anthocyanosides may help lower blood sugar by improving insulin production and sensitivity.



PERSONALIZED TO YOUR GENES

The [LEP](#) gene helps make [leptin](#), a key hormone in appetite and metabolism control. Leptin improves insulin sensitivity and helps reduce blood sugar levels [R, R, R, R].

Your genotype for [rs791595](#) may contribute to [leptin resistance](#). It's been associated with increased [blood sugar](#) levels [R, R].

The consumption of polyphenol-rich fruits, such as [blueberries](#) and [bilberries](#), may improve leptin resistance [R, R, R].

>>> To learn more about the link between the *LEP* gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
IMPDH1	rs791595	AG	

85



Maintain Optimal Vitamin D Levels

IMPACT

2 / 5

EVIDENCE

3 / 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

People with vitamin D deficiency are more likely to have high blood sugar [\[R\]](#), [\[R\]](#).

Vitamin D helps reduce blood sugar by [\[R\]](#), [\[R\]](#):

- Boosting insulin sensitivity
- Supporting pancreas function
- Improving [oxidative stress](#)
- Lowering inflammation

Vitamin D supplements may help control blood sugar. However, they may only help if you lack vitamin D [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Health experts say there’s not enough evidence to recommend vitamin D supplementation for diabetes [\[R\]](#).

In a randomized controlled trial at a teaching hospital, 70 women with gestational diabetes (GDM) at 24-28 weeks of pregnancy were divided into two groups. Group A (n = 34) received vitamin D 1000 IU and calcium 1000 mg daily, while Group B (n = 36) received vitamin D 250 IU and calcium 500 mg daily for 6 weeks. Group A showed significant reductions in FPG, fasting serum insulin, LDL, total cholesterol levels, and an increase in HDL levels. Group B only showed a significant decrease in FPG after 6 weeks of supplementation [\[R\]](#).

However, genetically predicted higher serum calcium levels may be associated with an increased risk for diabetes [\[R\]](#).

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* [\[R\]](#).



PERSONALIZED TO YOUR GENES

[HLA-C](#) and other *HLA* genes help make immune proteins involved in various autoimmune conditions, including type 1 diabetes. According to limited research, HLA-associated inflammation may impair [blood sugar](#) control [\[R\]](#), [\[R\]](#), [\[R\]](#).

Your genotype for [rs2844623](#) ('CC'; *homozygous major*) has been correlated with higher blood sugar levels — possibly due to increased HLA activity [\[R\]](#).

Some studies suggest that UV light and [vitamin D](#) have beneficial effects on autoimmunity by suppressing HLA proteins. [\[R\]](#), [\[R\]](#), [\[R\]](#).

>>> To learn more about the link between the *HLA* genes and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
HLA-C	rs2844623	CC	

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L-Carnitine

IMPACT



EVIDENCE



How to implement

Take 500 mg of L-carnitine supplement daily with a glass of water, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

500 mg

Description

L-carnitine is an amino acid-like compound that plays a role in energy metabolism and helps prevent toxic substances from building up in cells. It is often used in dietary supplements for its potential to support muscle recovery, reduce fatigue, and enhance athletic performance.

[L-carnitine](#) is a compound that helps you burn fat. It also prevents toxic substances from building up in cells [\[R\]](#).

Your body can usually make enough carnitine to meet its needs. You can also get it from **meat and dairy products** [\[R\]](#).

People use L-carnitine for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Heart problems
- Overactive thyroid
- Fertility problems
- Blood sugar control
- Weight control

How it helps

L-carnitine may boost your sensitivity to insulin. It helps remove chemicals linked to insulin resistance from your cells [\[R\]](#).

L-carnitine (0.2-3 g/day for 1-12 months) may help reduce blood sugar levels [\[R\]](#), [\[R\]](#), [\[R\]](#).

87



Barberry

IMPACT

2 / 5

EVIDENCE

3 / 5

How to implement

Take a barberry supplement of 500-1000 mg daily, divided into two or three doses with meals for up to 12 weeks. Do not exceed the recommended dose without consulting a healthcare provider.

TYPICAL STARTING DOSE

500 mg

Description

Barberry is an herbal remedy used in traditional medicine for its potential to support digestive health and reduce inflammation. It contains compounds that may have antimicrobial and antioxidant properties.

How it helps

A meta-analysis of 7 studies and 452 participants found that barberry supplementation can lower insulin levels but not fasting glucose, insulin resistance, or HbA1c. Another meta-analysis reported that both types of barberry reduce glucose levels in patients with metabolic syndrome. In non-placebo-controlled trials, consuming barberry juice decreased fasting glucose in patients with type 2 diabetes. Furthermore, a combination of barberry and milk thistle lowered fasting glucose and insulin resistance in patients with dyslipidemia. This combination also improved various metabolic parameters in obese individuals with type 2 diabetes and reduced insulin dosage requirements in patients with type 1 diabetes in placebo-controlled trials. Finally, barberry capsules reduced fasting glucose in patients with rheumatoid arthritis [\[R, R, R, R, R, R, R\]](#).

Barberry contains an active compound called berberine that can help lower high blood sugar levels by increasing insulin production and improving insulin sensitivity.

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Avoid Noise Pollution

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Minimize exposure to loud environments by using noise-cancelling headphones or earplugs, especially in areas known for high noise levels such as construction sites, concerts, and busy urban streets. Aim to keep the volume of personal audio devices below 60% of their maximum. At home, use carpets, curtains, and wall fabrics to reduce indoor noise, and prefer quieter appliances. Try to dedicate at least one hour of quiet time before bed to aid in relaxation and improve sleep quality.

Description

Noise pollution refers to the presence of excessive, disruptive, or unwanted sound in the environment. It often includes sounds from traffic, industrial machinery, construction, loud music, and other sources that exceed acceptable or comfortable noise levels. Noise pollution disrupts normal activities and can have detrimental effects on human health, well-being, and the natural world.

Prolonged exposure to high noise levels can lead to a range of health issues, including:

- Stress
- Anxiety,
- Sleep disturbances
- High blood pressure
- Heart disease
- Impaired cognitive function

How it helps

A meta-analysis of 9 studies concluded that being exposed to residential (but not occupational) 60 dB increases the risk of type 2 diabetes by 19-22% [\[R\]](#).

89



Cardamom

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mg of cardamom powder or extract supplement daily with water, preferably after meals. Continue this regimen daily for at least 8-12 weeks to potentially observe benefits.

TYPICAL STARTING DOSE
500 mg

Description

Cardamom is a fragrant spice known for its potential to aid digestion, reduce inflammation, and provide antioxidant benefits. Incorporating cardamom into your diet or as a herbal remedy can promote overall digestive comfort and well-being.

[Cardamom](#) (*Elettaria cardamomum*) is a plant in the ginger family used to flavor food. It’s also known as green cardamom or the “Queen of Spices,” due to its price tag [\[R\]](#), [\[R\]](#).

The plant produces pods or capsules that contain 15-20 seeds each. The seeds can be used whole or can be ground to a fine powder before use [\[R\]](#), [\[R\]](#).

Some people use cardamom powder to help lower triglycerides [\[R\]](#), [\[R\]](#).

How it helps

A meta-analysis of 6 studies and 410 participants concluded that supplementation with cardamom (3 g/day for 2-3 months) reduces HbA1c levels and insulin resistance but has no effect on fasting blood sugar, insulin, BMI, weight, and waist circumference [\[R\]](#).

Cardamom contains compounds that may help cells remove excess sugar in the blood, potentially reducing high blood sugar levels.

90



Soy Isoflavones

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take a soy isoflavone supplement containing 40 to 80 milligrams daily, ideally with food to improve absorption. This dosage can be continued on a daily basis for several months, but it's recommended to reevaluate its effectiveness and any potential side effects with a healthcare provider periodically.

TYPICAL STARTING DOSE

40 mg

Description

Soy isoflavones are natural compounds found in soybeans and soy products. They are phytoestrogens, which means they can mimic the effects of estrogen in the body and are associated with potential health benefits like menopausal symptom relief and improved heart health.

Soy is a common food in many cuisines around the world, especially Asian cuisines [\[R\]](#).

It's a great source of [\[R\]](#), [\[R\]](#):

- Plant-based protein
- Fiber
- Omega-3 fats
- Antioxidants (isoflavones)

Soy-based foods include [\[R\]](#):

- Tofu
- Tempeh
- Edamame
- Miso
- Natto

Soy protein and soy isoflavones are also available as supplements.

How it helps

A meta-analysis of 17 studies and 1,529 postmenopausal women found that soy isoflavones, especially genistein, may slightly improve glucose metabolism [\[R\]](#).

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Sesame Oil

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Use sesame oil as your primary cooking oil or add 1-2 tablespoons to your salads, stir-fries, or marinades daily. It can be used both for high-heat cooking and cold dishes.

Description

Sesame oil is an edible oil made from sesame seeds and is rich in healthy fats, including monounsaturated and polyunsaturated fats. It is commonly used in cooking and as a skincare oil due to its potential health benefits.

Sesame oil has some vitamin E as well as omega fatty acids, providing antioxidant and anti-inflammatory properties. The fat content is 39% oleic acid.

How it helps

In 5 non-placebo-controlled trials of 446 people with type 2 diabetes and 75 with metabolic syndrome, including sesame oil in the diet for 30-90 days reduced blood glucose and HbA1c, as well as lowering blood pressure and improving blood fat profile. In one of them, sesame oil enhanced the effects of the antidiabetic drug glibenclamide [\[R, R, R, R, R\]](#).

92



Pycnogenol

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 100 mg of pycnogenol supplement daily. This can be taken in a single dose or divided into two doses of 50 mg each, one in the morning and one in the evening.

TYPICAL STARTING DOSE

100 mg

Description

Pycnogenol (pine bark extract) is derived from the bark of the maritime pine (Pinus pinaster). It has been used in traditional n European folk medicine for centuries, and more recently as a supplement. The extract contains a group of bioactive compounds known as proanthocyanidins, which may be beneficial in supporting cardiovascular health, promoting skin health, and aiding in the management of various conditions related to inflammation and oxidative stress.

Pycnogenol comes from the bark of pine trees that grow in the Mediterranean [\[R, R\]](#).

It may improve [\[R, R, R, R, R, R\]](#):

- Athletic performance
- Seasonal allergies
- Cognitive function
- Joint health
- Varicose veins

How it helps

Pycnogenol (100-200 mg/day) lowered blood glucose and HbA1c when taken for 12 weeks in 3 trials (2 of them placebo-controlled) of 155 people with type 2 diabetes [\[R, R, R\]](#).

Pycnogenol (100-150 mg/day) had similar effects in 3 non-placebo-controlled trials of 122 people with metabolic syndrome and 35 perimenopausal women [\[R, R, R\]](#).

However, in all the above studies, insulin levels did not change. Pycnogenol may reduce glucose levels, but it doesn't appear to increase insulin production or insulin sensitivity.

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Glutamine

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 5 to 10 grams of glutamine powder, mixed with water or another beverage, daily. It can be divided into two servings, one in the morning and the other in the evening. This supplementation is generally considered safe for long-term use, but it's best to consult with a healthcare provider for personalized advice.

TYPICAL STARTING DOSE

5 g

Description

Glutamine is an amino acid that plays a role in various bodily functions, including immune support and gut health. It may help with muscle recovery and overall well-being, particularly for individuals engaging in strenuous exercise.

L-glutamine is an amino acid produced by the body. Its levels may decrease during periods of stress or illness. It is important for protein and energy production, and helps control kidney pH balance [\[R\]](#).

Some people take L-glutamine as a supplement to help with [\[R\]](#):

- Gut health
- Immunity
- Exercise recovery and muscle performance
- Brain health

How it helps

In 4 placebo-controlled trials of 13 patients with type 2 diabetes, supplementation with glutamine (30 g/day) for up to 6 weeks lowered HbA1c, body fat, body mass, waist circumference, postprandial glucose while increasing postprandial insulin, GLP-1, GIP, and insulin [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

94



Apples and Pears

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate at least one medium-sized apple and one medium-sized pear into your daily diet. Consume them as part of your meals or as snacks between meals to ensure you receive their full nutritional benefits.

Description

How it helps

A meta-analysis of 5 studies and over 228,000 participants found that eating apples and pears was linked to an 18% lower risk of type 2 diabetes, with a 3% risk reduction per weekly serving increase. Similarly, a study of 12,198 participants found that every daily serving of apples or pears reduced the risk of type 2 diabetes by 7%. A meta-analysis of 22 studies identified type 2 diabetes among the diseases whose risk is decreased by apple or pear intake. However, a meta-analysis of 22 studies found that apples decreased BMI but had no effect on blood glucose [\[R, R,R, R\]](#).

In a non-placebo-controlled trial of 18 healthy women, consuming an apple before rice significantly reduced post-meal glucose response by 50%, its peak value by 51.4%, and glycemic excursion by 52.6%. Similarly, a study of 21 healthy subjects found that dried apples lowered post-prandial glucose levels compared to muffins [\[R, R\]](#).

95



Ivy Gourd Extract

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 300-400 mg of ivy gourd extract daily, preferably with meals to enhance absorption. This can be continued for 6-8 weeks to evaluate its effects on blood sugar levels. Always check the supplement's label for specific instructions.

TYPICAL STARTING DOSE

300 mg

Description

Ivy gourd extract is used as a dietary supplement for its potential to aid in blood sugar management. It contains bioactive compounds that may support better glycemic control and overall well-being.

How it helps

In 4 placebo-controlled trials of 295 people with type 2 diabetes, taking ivy gourd leaves (20 g) or their extract (500-1,000 mg/day) for 6-12 weeks improved fasting and non-fasting blood glucose, glycated hemoglobin, and glucose tolerance [\[R, R, R, R\]](#).

Ivy gourd may help by mimicking insulin.

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Dietary Pentadecanoic Acid

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

While there is no officially recommended daily intake for pentadecanoic acid, research suggests that **20–50 mg per day** may support health benefits such as improved metabolism, reduced inflammation, and enhanced cellular health. You can achieve this through a balanced diet rich in full-fat dairy and fatty fish or by taking supplements as directed. Always consult with a healthcare professional before starting supplementation, especially if you have specific health conditions or dietary restrictions.

Description

Pentadecanoic acid, also known as C15:0, is a 15-carbon saturated fatty acid that belongs to the group of odd-chain fatty acids. It is naturally found in [\[R\]](#):

- Full-fat dairy products (e.g., milk, butter, and cheese)
- Fatty fish (salmon, herring, mackerel, sardines, anchovies, tuna)
- Whole grains
- Seed oils (flaxseed, chia, hemp)
- Legumes (lentils, chickpeas)

Unlike even-chain fatty acids, pentadecanoic acid has unique biological properties that are being increasingly studied for its potential health benefits.

Supplementation with pentadecanoic acid has shown promise in supporting metabolic health by improving cholesterol levels, enhancing insulin sensitivity, and reducing inflammation. It may also promote cellular health by stabilizing cell membranes and improving mitochondrial function. Additionally, C15:0 has been linked to better immune system regulation, neuroprotection, and potentially reducing the risk of chronic diseases like diabetes and cardiovascular conditions. As an emerging "essential fatty acid," it is gaining attention for its role in promoting long-term health and wellness.

How it helps

High blood pentadecanoic acid levels have been associated with a decreased risk of type 2 diabetes [\[R, R\]](#).

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Honey

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Consume 1-2 tablespoons of raw honey daily, either directly or by mixing it into warm water, tea, or yogurt. Continue this practice regularly to observe benefits.

Description

Honey is a natural sweetener known for its antimicrobial properties and potential benefits for wound healing. It contains antioxidants and may have soothing effects on sore throats and coughs.

[Honey](#) is a thick, sweet substance. It’s made by honeybees from the nectar of flowering plants. There are many different types of honey. Besides sugar, honey also contains amino acids (protein building blocks), vitamins, and minerals [\[R\]](#).

People use honey for its anti-inflammatory and antioxidant properties. It can potentially help with [\[R\]](#):

- Heart problems
- Gut problems
- Cough
- Burns

How it helps

A meta-analysis of 155 studies and 5086 participants concluded that food sources of fructose (including honey) decrease HbA1c (by 0.22% or 25.9 mmol/mol) [\[R\]](#).

Another meta-analysis (18 trials and 1105 participants) found that honey, especially Robinia, clover, and unprocessed raw honey, reduces fasting glucose (by 0.20 mmol/L) with low certainty of evidence [\[R\]](#).

98



American Ginseng

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take 200-400 mg of American ginseng extract daily, preferably with a meal to enhance absorption. This regimen can be followed continuously for up to 12 weeks, after which a break or reassessment of the need to continue should be considered.

TYPICAL STARTING DOSE

200 mg

Description

American ginseng is a perennial herb native to North America, particularly regions of the United States and Canada. It is valued for its potential health benefits, including immune system support, stress reduction, and enhanced cognitive function, with the primary active compounds being ginsenosides.

[Ginseng](#) is a plant people use to improve [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Sexual function
- Immunity
- Fatigue
- Attention

There are many different types of ginseng. The most common ones are [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Korean red ginseng, also called Asian ginseng (*Panax ginseng*)
- [American ginseng](#) (*Panax quinquefolius*)
- Chinese notoginseng, also called Sanchi (*Panax notoginseng*)

How it helps

In 4 placebo-controlled trials of 45 healthy people, a dose of 1-9 g taken at least 40 minutes before a meal lowered glucose spikes and improved insulin sensitivity. In 3 placebo-controlled trials of 43 people with type 2 diabetes, American ginseng reduced blood glucose levels (both fasting and post-meal) and HbA1c [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

A meta-analysis of 16 studies and 1688 participants concluded that ginseng (both Korean and American) modestly reduces fasting blood glucose but pointed out that the different ginseng types may differ in their effectiveness, making it necessary to conduct more clinical studies [\[R\]](#).

99



Mindfulness-Based Stress Reduction (MBSR)

IMPACT2 / 5

EVIDENCE2 / 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

A meta-analysis of 9 studies found mindfulness-based stress reduction and cognitive therapy effective at decreasing HbA1c levels and improving mood and quality of life in people with type 1 and type 2 diabetes [\[R\]](#).

100

Jiaogulan (Gynostemma Pentaphyllum)

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a capsule of jiaogulan (gynostemma pentaphyllum) containing 450 mg to 500 mg, three times a day with meals. Continue this routine daily for best results.

TYPICAL STARTING DOSE
1350 mg

Description

Jiaogulan, often referred to as the "immortality herb," is an herb used in traditional Chinese medicine for its potential adaptogenic and antioxidant properties. Some research suggests it may support overall well-being and longevity, but more studies are needed to confirm these effects.

[Gynostemma](#) (*Gynostemma pentaphyllum*), also called jiaogulan, is a climbing vine native to Southeast Asia. It is used in traditional Chinese medicine for [R](#):

- High cholesterol
- Diabetes

People call it the "poor man's [ginseng](#)" because it may have similar benefits but cost less than Panax (Asian) ginseng [R](#), [R](#).

How it helps

Drinking gynostemma tea (6 g/day) for 4-12 weeks reduced blood sugar levels before meals and insulin resistance in 2 placebo-controlled trials of 40 people with type 2 diabetes. In a placebo-controlled trial of 24 patients with type 2 diabetes, supplementation with gynostemma (6 g/day) for 12 weeks decreased fasting plasma glucose (by 3 mmol/L) [R](#), [R](#), [R](#).

Jiaogulan boosts insulin sensitivity which helps your cells absorb and utilize glucose, leading to lower blood sugar levels. It also helps moderate glucose and lipid metabolism, which helps keep blood sugar stable.

101



Breathing Techniques

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Practice deep breathing exercises for 10 minutes daily, preferably in a quiet space where you won't be disturbed. Sit or lie down in a comfortable position, slowly inhale through your nose, allowing your chest and lower belly to rise, hold the breath for a moment, and then exhale slowly through your mouth or nose. This can be done at any time of day to reduce stress and improve focus.

TYPICAL STARTING DOSE

10 minutes

Description

Breath awareness and specific breathing techniques, such as deep breathing or mindfulness-based practices, can help reduce stress, improve focus, and enhance overall mental well-being. These techniques are valuable tools for managing anxiety and promoting relaxation.

Most breathing techniques involve taking slow and even breaths. Their main goal is to prevent rapid breathing (**hyperventilation**) [\[R\]](#).

Breathing techniques tend to help with [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Stress
- Anxiety
- Sleep problems
- Asthma

One example is the **Buteyko breathing technique**. It's often used by people with asthma or other conditions that affect the lungs [\[R\]](#).

Another example is **yogic breathing**. [Yoga](#) is a practice that combines breathing techniques with exercise and meditation [\[R\]](#), [\[R\]](#).

How it helps

In a non-placebo-controlled trial of 26 healthy volunteers, a relaxation breathing exercise improved the glycemic response. However, slow deep breathing failed to improve glucose metabolism in a non-placebo-controlled trial of 15 healthy men [\[R\]](#), [\[R\]](#).

Diaphragmatic breathing improved blood sugar control in 4 non-placebo-controlled trials of 16 healthy male cyclists, 123 patients with type 2 diabetes, and 60 women with gestational diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

102



Histidine

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500-1000 mg of histidine supplement per day, ideally with a meal. It is best to start with a lower dose, such as 500 mg, to assess tolerance and then adjust as needed up to 1000 mg. Consistent daily intake for at least 4 to 8 weeks may be necessary to notice benefits.

TYPICAL STARTING DOSE

500 mg

Description

Histidine is an essential amino acid that plays a role in protein synthesis and the formation of histamine. It is important for overall health and is found in various protein-rich foods.

A histidine supplement of up to 14 mg/kg/d can be taken to meet the needs not achieved through diet.

You can also increase your dietary histidine intake. Histidine is found in protein-rich foods such as meat, chicken, fish, beans, oats, and wheat. It's especially high in the Japanese food ingredient dashi or dried bonito, often used for soup stock [R].

How it helps

In a placebo-controlled trial of 100 obese women with metabolic syndrome, histidine supplementation (4 g/day) for 12 weeks significantly decreased insulin resistance [R].

Histidine (4 g/day) lowered blood glucose in a 12-week placebo-controlled trial of 37 obese women with metabolic syndrome [R].

A meta-analysis of 23 studies and 942 participants concluded that supplementation with histidine-containing dipeptides significantly reduces fasting glucose levels. The authors also found a trend toward increased insulin sensitivity and secretion [R].

103



Tocotrienols

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take tocotrienols as a dietary supplement in doses ranging from 100 to 200 mg, 1-2 times a day, ideally with meals to enhance absorption. This intake can be continuous, but it's recommended to review its effects with a healthcare provider periodically, typically every 6 to 12 months.

TYPICAL STARTING DOSE
100 mg

Description

Tocotrienols are a form of vitamin E that helps to protect your cells. They fight harmful substances in your body called free radicals, which can damage our cells and lead to illness. By helping your body in this way, tocotrienols contribute to overall health, boosting immunity, and slowing down aging processes.

How it helps

In a randomized controlled trial in 82 patients with metabolic syndrome, δ -tocotrienol in combination with resveratrol (400 mg capsule, δ -tocotrienol 250 mg; resveratrol 150 mg, 2x/day for 24 weeks) lowered fasting glucose by 0.15 mmol/L. In 2 randomized controlled trials of 77 individuals with prediabetes and 110 with type 2 diabetes, delta-tocotrienol (300-250 mg/day for 12-24 weeks) reduced fasting plasma glucose, HbA1c, insulin, and insulin resistance. Two double-blinded randomized, active-controlled trials of 171 patients with NAFLD found that δ -tocotrienol lowered insulin resistance. However, a study cohort including 29,133 male smokers found no association between dietary α -tocopherol, β -tocopherol, and β -tocotrienol with risk of diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Tocotrienols may help by improving insulin sensitivity.

104



Mindfulness-Based Cognitive Therapy (MBCT)

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Participate in an 8-week course of Mindfulness-Based Cognitive Therapy (MBCT), which typically includes weekly group sessions (each lasting about 2 hours), daily homework practices (about 1 hour per day), and one all-day session after the fifth week. Sessions are led by trained instructors and focus on mindfulness meditation practices and cognitive behavioral exercises.

TYPICAL STARTING DOSE
2 hours

Description

Mindfulness-Based Cognitive Therapy (MBCT) is a therapeutic approach that combines mindfulness practices with cognitive-behavioral techniques to help individuals manage and prevent recurring episodes of depression and anxiety.

How it helps

A meta-analysis of 9 studies found mindfulness-based stress reduction and cognitive therapy effective at decreasing HbA1c levels and improving mood and quality of life in people with type 1 and type 2 diabetes [\[R\]](#).

105



Trehalose

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take 500 mg to 1000 mg of trehalose orally, twice daily, with or without food. This supplement regimen can be followed regularly, adjusting dosage as per individual tolerance and according to healthcare provider's advice.

TYPICAL STARTING DOSE
1000 mg

Description

Trehalose is a natural sugar found in various organisms, including some plants and microorganisms. It has gained attention for its potential to support cellular health and protect against certain diseases, although further research is needed to fully understand its health benefits and specific conditions it may be used for.

How it helps

In 2 non-placebo-controlled trials of 20 overweight subjects, consuming 75 g trehalose following an overnight fast and together with a standardized mixed meal caused lower peak glucose (by 33%) and insulin (by 14%) responses [\[R\]](#), [\[R\]](#).

Ingestion of trehalose (75 g) prior to 20 min of submaximal steady-state exercise attenuated postprandial plasma rise in glucose and insulin but had no effect on exercise performance in a non-placebo-controlled trial of 8 well-trained male cyclists [\[R\]](#).

In a non-placebo-controlled trial of 21 healthy volunteers, consuming 75 g of trehalose or a trehalose/fructose combination blunted glycemic and insulinemic incremental areas under the curve by 20-35% [\[R\]](#).

Consuming trehalose (10 g/day) for 12 weeks decreased blood glucose after an oral glucose test and progressed to insulin resistance in a non-placebo-controlled trial of 34 overweight participants. In a non-placebo-controlled trial of 50 healthy volunteers, consuming 3.3 g/day trehalose for 78 days lowered postprandial blood glucose [\[R\]](#), [\[R\]](#).

106



Propolis

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a propolis supplement in capsule or tablet form, typically ranging from 500mg to 1000mg per day. It's best to follow the dosage instructions on the product label or a healthcare provider's advice. Propolis can be taken continuously, but consult a healthcare provider for specific durations especially if it exceeds three months.

Description

Propolis is a resinous substance collected by bees from tree buds and used to seal their hives. It has been traditionally used in natural medicine for its potential antimicrobial properties and as a source of antioxidants that may support oral and immune health.

Propolis is a waxy compound, also known as “bee glue.” Honeybees make it from plants and use it to build, repair, and protect their hives [\[R\]](#).

People use propolis to potentially help [\[R\]](#):

- Reduce the appearance of acne
- Maintain oral health
- Support the immune system

How it helps

In 5 placebo-controlled trials of 337 people with type 2 diabetes, taking oral propolis (400-1500 mg/day) for 8-24 weeks reduced fasting and post-meal blood glucose, post-meal insulin, HbA1c levels, and oxidative status [\[R, R, R, R, R\]](#).

A meta-analysis of 6 trials and 373 people concluded that propolis significantly reduces fasting blood glucose and HbA1c levels, but not fasting insulin or insulin resistance [\[R\]](#).

107



Mindfulness Meditation

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Practice mindfulness meditation for 10-20 minutes daily. Find a quiet, comfortable place to sit or lie down, then focus on your breath, observing thoughts and sensations without judgment. Consistency is key, so try to incorporate it into your daily routine, perhaps in the morning or before bed.

TYPICAL STARTING DOSE

30 minutes

Description

Mindfulness meditation involves focused attention on the breath or a specific point of focus to cultivate mindfulness and reduce stress. Regular meditation practice is associated with improved mental clarity, emotional regulation, and overall well-being.

How it helps

Mindfulness meditation may improve blood sugar control in patients with type 1 and type 2 diabetes. It may be most effective in combination with aerobic exercise [R, R, R].

Mindfulness meditation may help by reducing stress, potentially influencing the body's stress-related glucose regulation.

108



African Mango Seed Extract

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 150 mg of African mango seed extract twice daily, 30 minutes before meals with a glass of warm water. Continue this regimen for 10 weeks for optimal results.

TYPICAL STARTING DOSE

300 mg

Description

African mango (*Irvingia gabonensis*) is a tropical fruit native to West Africa. It is renowned for its potential health benefits, primarily attributed to its high fiber content and the presence of an extract known as Irvingia, which is believed to support weight management and improve metabolic health. African mango supplements are commonly used to aid in weight loss efforts and may help reduce cholesterol levels and improve blood sugar control.

[African mango](#) (*Irvingia gabonensis*), also known as wild mango, bush mango, dika, and ogbono, is a tree found in the rainforests of West Africa. African mango owes its name to its similarity to mangoes [\[R\]](#).

All parts of the African mango tree are used for a variety of purposes [\[R\]](#):

- The pulp is consumed as food or used to make jams, juice, and wine
- The seeds are eaten raw or used to prepare foods and supplements
- The roots, bark, leaves, and seeds are used to make traditional medicines

How it helps

In a placebo-controlled trial of 24 people with metabolic syndrome, taking African mango seed extract (150 mg, 2x/day) for 90 days reduced blood sugar and fat levels, and even caused metabolic syndrome remission in 58% of the patients. In a placebo-controlled trial of 102 overweight volunteers, African mango seed extract (150 mg/day for 8 weeks) decreased fasting blood glucose levels by 25% [\[R\]](#), [\[R\]](#).

The combination of African mango and *Cissus quadrangularis* extract improved fasting glucose, blood lipid profile, and weight better than *Cissus quadrangularis* alone in a 10-week placebo-controlled trial of 72 people with excess weight [\[R\]](#).

In a placebo-controlled trial of 40 obese people, the fiber-rich African mango seeds (4.15 g/day for one month) reduced blood sugar levels (by 32.36%), improved blood fat profile, and helped lose weight [\[R\]](#).

109



Biotin And Chromium Picolinate

IMPACT

2 / 5

EVIDENCE

2 / 5

Description

Biotin and Chromium Picolinate are nutrients that your body needs for good health. Biotin, a type of B vitamin, helps to turn the food you eat into energy. Chromium Picolinate helps your body maintain proper sugar levels and can contribute to weight loss. Both are essential for maintaining a healthy metabolism and overall wellbeing.

How it helps

The combination of biotin (2 mg/day) and chromium picolinate (600 mcg/day) taken for 28-90 days lowered fasting glucose (by 9.8 mg/dL), 2-hour glucose after a glucose tolerance test (by 9.7%), and HbA1c in 4 placebo-controlled trials of 874 patients with type 2 diabetes [\[R, R, R, R\]](#).

Biotin has a crucial role in regulating genes linked to blood glucose control in our bodies. Chromium picolinate assists insulin, the hormone critical to converting food into energy.

110



Lactobacillus Plantarum

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a probiotic supplement containing *Lactobacillus plantarum* 299V daily. The typical dosage is 10 billion colony-forming units (CFUs). Continue for at least 4 weeks to assess benefits on digestive health.

TYPICAL STARTING DOSE
10 billion CFU

Description

Lactobacillus plantarum is a [probiotic](#) bacterium found in many fermented plant products such as sauerkraut, pickles, brined olives, and Korean kimchi [\[R\]](#).

People take *L. plantarum* supplements to improve [\[R, R, R, R\]](#):

- Diarrhea
- Skin appearance
- IBD
- High cholesterol

How it helps

In a placebo-controlled trial of 40 prediabetic subjects, supplementation with *L. plantarum* HAC01 for 8 weeks lowered 2 h postprandial glucose and HbA1c levels. Similarly, consuming yogurt with heat-treated *L. plantarum* OLL2712 (5 x 10⁹ cells/day) for 12 weeks reduced HbA1c and fasting blood glucose in a placebo-controlled trial of 130 prediabetic subjects [\[R, R\]](#).

In a placebo-controlled trial of 24 postmenopausal women with metabolic syndrome, drinking fermented milk with *L. plantarum* (80 mL/day) for 90 days lowered fasting glucose [\[R\]](#).

 PERSONALIZED TO YOUR GENES

[HLA-C](#) and other *HLA* genes help make immune proteins involved in various autoimmune conditions, including type 1 diabetes. According to limited research, HLA-associated inflammation may impair [blood sugar](#) control [\[R, R, R\]](#).

Your genotype for [rs2844623](#) ('CC'; *homozygous major*) has been correlated with higher blood sugar levels — possibly due to increased HLA activity [\[R\]](#).

[Probiotics](#) may improve different inflammatory conditions, partly due to their ability to inhibit HLA proteins [\[R, R, R\]](#).

>>> To learn more about the link between the HLA genes and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
HLA-C	rs2844623	CC	

111



Jujube

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take jujube supplements in the form of capsules or extract, generally ranging from 250 mg to 500 mg, once or twice daily. It is recommended to follow the dosage instructions on the product label or consult a healthcare professional for personalized advice. For best results, incorporate into your daily routine for at least 4 to 8 weeks.

TYPICAL STARTING DOSE

250 mg

Description

Jujube is a fruit rich in antioxidants and vitamins. It can support digestive health, provide a source of essential nutrients, and contribute to overall well-being when included in the diet.

How it helps

In a non-placebo-controlled trial of 48 patients with type 2 diabetes, supplementation with dried jujube (30 g/day) for 12 weeks lowered fasting glucose (by 11.36%), triglycerides (by 13.59%), LDL cholesterol (by 7.46%), and CRP (by 24.46%). Similarly, consuming jujube infusion (10 g/100 mL boiling water) 3x/day before meals as an add-on to a balanced diet for 12 weeks lowered HbA1c, total cholesterol (by 5.69 mg/dL), triglycerides (by 16.14 mg/dL), LDL cholesterol (by 13.30 mg/dL), LDL:HDL, and TC:HDL in a non-placebo-controlled trial of 116 patients with type 2 diabetes. In a placebo-controlled trial of 86 obese adolescents with dyslipidemia, supplementation with jujube fruit powder (5 g, 3x/day) for 1 month decreased total and LDL cholesterol [\[R\]](#), [\[R\]](#), [\[R\]](#).

Jujube may help through its high fiber content.

112



Gymnema

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a gymnema supplement containing 200 to 400 mg of gymnemic acids daily, ideally with a meal to potentially aid in reducing sugar absorption in the intestines. The duration can vary, but many users incorporate it into their daily routine for several months to assess its effects on blood sugar levels and cravings for sweets.

TYPICAL STARTING DOSE

200 mg

Description

Gymnema is an herb used in traditional medicine for its potential to support blood sugar control. Some studies suggest it may have benefits for individuals with diabetes, but it's important to consult with a healthcare provider before using it as a supplement.

[Gymnema](#) (*Gymnema silvestris*), also known as cowplant, gurmarmar, or periploca of the woods, is a plant originally from India. In Ayurvedic medicine, it is known as meshashringi or “the destroyer of sugar” because it temporarily **reduces the taste of sugar** on the tongue [\[R\]](#), [\[R\]](#).

It is traditionally used for [\[R\]](#), [\[R\]](#):

- Diabetes
- Weight loss
- High cholesterol

How it helps

A gymnema supplement (400 mg/day) reduced the needed dose of antidiabetic medication in an uncontrolled trial of 22 people with type 2 diabetes and the need for insulin in an uncontrolled trial of 27 with type 1 diabetes. Five patients with type 2 diabetes didn’t even need any conventional treatment at all for the duration of the trial [\[R\]](#), [\[R\]](#).

In 3 trials (1 of them non-placebo-controlled) of 101 people with type 2 diabetes, both a gymnema supplement (0.5-1 g/day) and ground gymnema leaves (1 g/day) decreased blood glucose levels (by 37%) [\[R\]](#), [\[R\]](#), [\[R\]](#).

In a placebo-controlled trial of 30 people with impaired glucose tolerance, supplementation with gymnema extract (300 mg, 2x/day) decreased blood glucose spikes 2 hours after an oral glucose tolerance test and HbA1c levels [\[R\]](#).

However, gymnema extract had no effects on insulin secretion or insulin sensitivity in a placebo-controlled trial of 24 people with metabolic syndrome [\[R\]](#).

Gymnema extracts are believed to help improve diabetes by the combination of several actions: slowing the absorption of glucose in the gut, stimulating the release of insulin from the pancreas while helping to regenerate the cells that produce it (beta-cells, which are damaged by diabetes), and correcting the use and storage of glucose in the body [\[R\]](#), [\[R\]](#), [\[R\]](#).

113



Papaya

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mg of papaya extract daily for at least one month to observe potential health benefits. If using powdered form, it can be mixed with water or juice for easier consumption.

TYPICAL STARTING DOSE

500 mg

Description

Papaya is a tropical fruit native to Central America and Mexico that is rich in vitamins A and C, folate, and dietary fiber. It has a long history in traditional medicines as a digestive aid and promoting skin health. Papaya's extract, papain, is used as a dietary supplement for digestive support.

Papaya is a tropical orange fruit. It originates from Central America, but today it’s most widely grown in India.

People enjoy the great taste of papaya. It’s also rich in healthy nutrients that may support the immune system.

How it helps

In a non-placebo-controlled trial of 19 healthy volunteers, papaya (both bites and puree) was found to elicit low postprandial glycemic responses [R].

In a non-placebo-controlled trial of 25 patients with type 2 diabetes and 25 healthy subjects, consuming a fermented papaya preparation (3 g/day) for 2 months reduced plasma glucose and the need for antidiabetic medication in those with diabetes. Consuming fermented papaya (6 g/day for 14 weeks) reduced oxidative damage, CRP, LDL:HDL, and ferritin in a non-placebo-controlled trial of 127 patients with type 2 diabetes. A fermented papaya preparation (9 g/day for 6 weeks) corrected inducible "respiratory burst" function in a non-placebo-controlled trial of 17 patients with type 2 diabetes [R, R, R].

Papaya is high in fiber and lower in sugar content. In addition, its antioxidant properties can help protect against the damage caused by high blood sugar.

114



Salacia Extract

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 240 to 480 milligrams of Salacia extract in capsule form, once or twice daily before meals. This supplementation should be continued for at least 4 to 12 weeks to evaluate its effects on blood sugar levels and weight management.

TYPICAL STARTING DOSE

240 mg

Description

Salacia extract is derived from the Salacia plant, primarily found in India and Sri Lanka. Traditionally, it has been used for its potential medicinal properties, including blood sugar management. The extract contains various compounds, with salacinol and kotalanol being the most notable. It is used as a supplement for blood sugar control and weight management.

How it helps

Taking salacia extract (500-1,000 mg) reduced blood glucose after meals in 2 placebo-controlled trials of 82 healthy volunteers [\[R\]](#), [\[R\]](#).

Another salacia species (*Salacia chinensis*) reduced blood glucose and insulin, insulin sensitivity, and glycated hemoglobin after meals when taken at doses of 150-600 mg/day in 3 placebo-controlled trials of 93 healthy volunteers [\[R\]](#), [\[R\]](#).

In 3 placebo-controlled trials of 117 people with type 2 diabetes and 29 with prediabetes, the extracts of *S. oblonga* (240-480 mg/day) and *S. reticulata* (500 mg/day) lowered fasting and post-meal blood glucose, post-meal insulin, and HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#).

A polyherbal Ayurvedic formulation with salsacia taken for 8 weeks lowered post-meal and fasting glucose levels in a non-placebo-controlled trial of 89 people with type 2 diabetes and 50 healthy volunteers [\[R\]](#).

Salacia extract may help by inhibiting the enzymes that digest carbohydrates in your digestive system.

115



Magnesium Chloride

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 200-400 mg of magnesium chloride daily, ideally in divided doses with meals to reduce the risk of stomach upset. It can be taken indefinitely as part of a daily supplementation routine to support magnesium levels in the body.

TYPICAL STARTING DOSE

200 mg

Description

Magnesium chloride is a magnesium supplement that can be used to support magnesium levels in the body. It may help alleviate symptoms of magnesium deficiency, such as muscle cramps and fatigue.

How it helps

In a placebo-controlled trial of 198 participants with metabolic syndrome and low serum magnesium, supplementation with 5% magnesium chloride lowered systolic blood pressure (by 3.6 mmHg), diastolic blood pressure (by 5.5 mmHg), fasting glucose (by 12.4 mg/dL), triglycerides (by 61.2 mg/dL) while increasing HDL cholesterol (by 0.9 mg/dL) [R].

A randomized controlled trial of people with prediabetes found that oral magnesium chloride reduced the risk of diabetes and cardiovascular disease. In another placebo-controlled trial of 63 patients with type 2 diabetes, supplementation with magnesium chloride for 16 weeks lowered the HOMA-IR index (by 1.2), fasting glucose (by 2.3 mmol/L), and HbA1c. Magnesium chloride (2.5 g/day for 3 months) also lowered HOMA-IR (by 2) in a placebo-controlled trial of non-diabetic subjects with insulin resistance [R, R, R].

However, sustained-release magnesium chloride (384 mg/day for 6 weeks) only lowered systolic blood pressure (by 7.4 mmHg) in a placebo-controlled trial of 28 diabetic patients [R].

Magnesium may help by improving the ability of pancreatic beta-cells to improve insulin sensitivity [R].

116



Avoid Perchlorate

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

To avoid perchlorate, check water quality reports for your area to ensure your drinking water does not contain high levels of perchlorate. Also, limit consumption of foods known to have higher perchlorate levels, such as leafy green vegetables, dairy products, and fruits, or opt for organic versions of these foods as organic farming standards restrict certain chemicals.

Description

Perchlorate is a chemical that can interfere with the thyroid gland's ability to produce thyroid hormone. This can lead to a variety of health problems, including hypothyroidism, developmental delays, and cancer. Avoiding perchlorate can help to protect your health.

How it helps

A study of 11,433 participants associated high levels of urinary perchorate with a 53% higher risk of diabetes and higher levels of fasting glucose, HbA1c, insulin, and insulin resistance [\[R\]](#).

117



Whole-Body Vibration

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Stand, sit, or lie on a machine with a vibrating platform for about 15 minutes a day, three times a week. Make sure to start with a lower intensity and gradually increase as you get more accustomed to the vibrations.

TYPICAL STARTING DOSE

15 minutes

Description

Whole-body vibration involves standing, sitting, or lying on a vibrating platform to stimulate muscle contractions. It's used in fitness routines and rehabilitation for improving muscle strength, circulation, and balance, and may benefit conditions like osteoporosis. No specific chemical compound or nutrient is associated with whole-body vibration.

Whole-body vibration is a form of exercise and treatment utilizing a vibrating platform upon which a person stands or performs various exercises. It creates vertical, oscillating vibrations with frequencies and amplitudes that can be controlled by the user [R].

Whole-body vibration is used for a variety of purposes, including [R]:

- Weight loss
- Boosting strength
- Improving balance/coordination
- Boosting mood

How it helps

A meta-analysis of 7 studies on type 2 diabetes patients (279 participants) revealed that whole-body vibration improved pain, leg blood flow, glycated hemoglobin, and fasting blood glucose. It also enhanced mobility, balance, and aerobic capacity. Another meta-analysis of 2 trials showed that whole-body vibration reduced fasting blood glucose by 25.7 mg/dL and improved various factors, primarily after 12 weeks [R, R].

Whole-body vibration can enhance muscle contractions, which can help your body use glucose and improve insulin sensitivity.

118



Astaxanthin

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take an astaxanthin supplement daily, with a typical dosage ranging from 4 to 12 mg. It is best taken with a fat-containing meal to enhance absorption.

TYPICAL STARTING DOSE

12 mg

Description

Astaxanthin is a powerful antioxidant found in certain microalgae and seafood. It is known for its potential benefits in reducing oxidative stress, supporting skin health, and promoting eye health.

[Astaxanthin](#) is a naturally-occurring orange-red pigment carotenoid found in algae, shrimp, lobster, crab, and salmon [\[R\]](#). As an antioxidant, astaxanthin is **10 times stronger than zeaxanthin, lutein and [beta-carotene](#), and 100 times stronger than [vitamin E](#)** [\[R\]](#). People take astaxanthin to:

- Support skin health [\[R, R\]](#)
- Reduce exercise fatigue [\[R, R\]](#)
- Prevent heart disease [\[R, R, R\]](#)

How it helps

In a placebo-controlled trial of 53 healthy and prediabetic participants, supplementation with astaxanthin (12 mg/day) for 12 weeks lowered glucose after an oral glucose tolerance test, HbA1c, apoE levels, and oxidized LDL [\[R\]](#).

Astaxanthin (8 mg/day taken for 8 weeks) lowered plasma glucose, triglycerides, visceral fat, VLDL, total cholesterol, and systolic blood pressure in a placebo-controlled trial of 44 patients with type 2 diabetes [\[R\]](#).

A multi-ingredient nutraceutical with astaxanthin, red yeast rice, berberine, policosanol, coenzyme Q10, and folic acid (NComb) lowers glucose (by 2.59mg/dL) according to a meta-analysis of 14 trials and over 3k participants [\[R\]](#).

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Poria

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500mg of Poria supplement orally once daily, with or without food. It is typically consumed in capsule form for ease of dosage and can be continued long-term on a daily basis.

Description

Poria, also known as Poria cocos, is a fungus that grows on the roots of certain trees, primarily in East Asia. It has been used traditionally in Chinese medicine for its potential to promote diuresis (increased urine production), support the spleen, digestive health, and improve sleep.

How it helps

A meta-analysis of 73 trials and 6,489 participants concluded that supplementation with poria-containing remedies as an add-on to antiglycemic agents lowers fasting blood glucose, 2-hour postprandial blood glucose, and HbA1c [\[R\]](#).

Poria may help by enhancing insulin sensitivity and improving pancreatic function.

120



Green Peas

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate a half cup of cooked or raw green peas into your diet at least three times a week. This can be as a side dish, added to salads, soups, or pasta dishes.

Description

Green peas are a nutritious vegetable packed with vitamins, fiber, and antioxidants. Including green peas in your diet can support digestive health, provide essential nutrients, and contribute to overall well-being.

Green peas are a good source of folate, manganese, iron, vitamins C , K, and A, fiber, as well as antioxidants. A ½ cup serving provides 47 mcg of folate or 12%DV.

How it helps

In a non-placebo-controlled trial of 26 healthy adults, consuming oat flour cereals with pea protein and/or starch reduced postprandial glycemic responses. Similarly, adding pea protein (24 g) to a chocolate beverage lowered blood glucose in a non-placebo-controlled trial of 20 men. In a non-placebo-controlled trial of 9 patients with type 2 diabetes, consuming a meal with dried peas as carbohydrate source delayed and reduced postprandial plasma glucose and insulin responses [\[R\]](#), [\[R\]](#), [\[R\]](#).

Green peas are low in sugar and high in dietary fiber. Additionally, they have a low glycemic index.

121



Oyster Mushroom

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Consume 600 mg to 1.2 grams of oyster mushroom extract in supplement form daily, ideally divided into two or three doses. Continue this routine for 1 to 2 months to evaluate its effects on your health.

TYPICAL STARTING DOSE

600 mg

Description

Oyster mushrooms (pleurotus ostreatus) are a popular and edible species of mushroom grown all over the world, rich in protein, fiber, B-vitamins, vitamin D, postassium, iron, and selenium. They have been used in Chinese medicine for their potential benefits toward immune function. They are eat today for being nutritious and a source of antioxidants.

How it helps

In various non-placebo-controlled trials, oyster mushrooms and a related species, *P. eryngii*, showed potential benefits in glycemic control. Oyster mushrooms reduced fasting and postprandial glucose levels in healthy volunteers and improved postprandial glucose and insulin levels in type 2 diabetics. Consumption of oyster mushrooms over three months decreased fasting glucose levels in both sexes. Additionally, *P. eryngii* improved postprandial glycemia, appetite, and ghrelin levels in individuals with metabolically unhealthy obesity [R, R, R].

Oyster mushrooms contain a natural type of insulin that helps to lower blood sugars by mimicking the function of insulin in your body. This results in decreased blood glucose levels.

122



Yacon

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate yacon, which is a sweet-tasting root vegetable, into your diet by consuming 1-2 teaspoons of yacon syrup with meals daily to benefit from its prebiotic and blood sugar-lowering properties. Alternatively, yacon root can be eaten raw, baked, or made into tea. It's recommended to start with smaller amounts to assess tolerance.

Description

Yacon is a root vegetable native to South America and is used as a natural sweetener due to its high content of fructooligosaccharides. Yacon syrup or powder is often consumed for its potential prebiotic effects, promoting gut health and supporting weight management.

How it helps

In 2 placebo-controlled trials of 40 women (20 normal-weight and 20 obese), consuming breakfast plus 40 g yacon syrup lowered postprandial glucose and insulin. Yacon was most effective in those with a higher abundance of *Actinobacteria* and *Bifidobacteriales* [R, R].

Yacon is high in fructooligosaccharides, a type of sugar that the body doesn't absorb or digest.

123



Creatine

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 4 grams of creatine supplement daily, ideally mixed with water or juice. This dosage can be maintained consistently without needing specific periods of cycling on or off.

TYPICAL STARTING DOSE

2 g

Description

Creatine is a popular dietary supplement among athletes and bodybuilders, known to enhance muscle performance during short bursts of high-intensity activities. It may help improve exercise performance and support muscle growth when used as directed.

[Creatine](#) is a compound naturally produced by the body. It’s stored in the muscles and brain [\[R\]](#).

During exercise, creatine is released to boost performance and help build muscles. For this reason, it’s a popular supplement among athletes [\[R\]](#), [\[R\]](#).

Sources of creatine include [\[R\]](#):

- Red meat
- Seafood
- Supplements

How it helps

Creatine (2.5-15 g/day), along with cardio training, reduced blood glucose levels in 2 placebo-controlled trials of 55 healthy but sedentary people. A similar program combining creatine (5 g/day) and exercise improved blood glucose control and reduced HbA1c levels in another placebo-controlled trial of 25 people with type 2 diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#).

However, creatine alone (3-20 g/day) had no effects on glucose tolerance or insulin sensitivity in a placebo-controlled trial of 17 healthy people [\[R\]](#).

Creatine (3-6 g/day) also lowered blood sugar after meals with effects comparable to those of metformin and glibenclamide in 2 non-placebo-controlled trials of 62 people with type 2 diabetes [\[R\]](#), [\[R\]](#).

124



Fruits

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate at least two servings of fresh, frozen, or canned fruits into your daily diet, aiming for a variety of colors and types to ensure a broad intake of vitamins, minerals, and antioxidants. One serving is equivalent to one medium-sized fruit, such as an apple or banana, or one-half cup of chopped fruit.

Description

Fruits are rich in vitamins, minerals, fiber, and antioxidants, making them essential for a balanced diet. Regular fruit consumption is associated with various health benefits, including better heart health, improved digestion, and reduced risk of chronic diseases.

Fruits are tasty and healthy foods high in vitamins, minerals, and antioxidants. They help reduce inflammation and support health in different ways.

Common examples include:

- Apples
- Oranges
- Bananas
- Grapes
- Watermelons

How it helps

A meta-analysis of 23 studies associated a high intake of fruits, especially berries, with a decreased risk of type 2 diabetes. In patients with this condition, increasing fruit intake may lower fasting glucose but not HbA1c according to a meta-analysis of 19 trials and 888 patients [R, R].

Fruits may help through their high fiber content. Importantly, the sugar load is higher after fruit juice because juicing reduces fiber content while maintaining sucrose [R].

125



Broccoli Sprouts

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Consume 2-4 tablespoons of fresh broccoli sprouts daily. They can be added to salads, sandwiches, or smoothies to make them easier to consume. Continue this practice daily for at least 3 months to potentially see benefits.

TYPICAL STARTING DOSE
2 tbsp

Description

Broccoli and broccoli sprouts are nutrient-dense vegetables packed with vitamins, minerals, and antioxidants. They are known for their potential to support a healthy immune system, protect against chronic diseases, and promote overall nutritional wellness.

How it helps

A meta-analysis of 17 studies using broccoli sprouts as an intervention found consistent results for blood glucose, lipid profile, and oxidative stress improvement [\[R\]](#).

Broccoli sprouts are rich in a compound called sulforaphane, which significantly improves blood sugar control.

126



Allulose

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

For incorporating allulose as a supplement, use it as a sugar substitute in your daily diet. You can add it to coffee, tea, smoothies, or use it for baking and cooking. Aim for no more than about 30 grams per day to avoid digestive discomfort, as excessive consumption can lead to bloating or diarrhea.

TYPICAL STARTING DOSE
30 g

Description

Allulose is a low-calorie sugar substitute found naturally in small quantities in certain foods, including wheat and raisins. It is used as a sweetener in some products and is believed to have minimal impact on blood sugar levels.

How it helps

Multiple studies and meta-analyses suggest that allulose, when consumed in doses of 5-10 g, can reduce fasting and postprandial glucose levels in individuals without diabetes. However, it does not significantly affect HbA1c or fasting insulin levels. Additionally, allulose (10-25 g/day) lowered blood glucose levels in healthy participants and postprandial blood glucose response (by 8%) in individuals with type 2 diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Allulose is a low-calorie sugar that doesn't raise your blood sugar levels, thus helping control high blood sugar. It may also improve your body's ability to use insulin effectively.

127



Astragalus

IMPACT

2 / 5

EVIDENCE

2 / 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

Astragalus is the most popular herb for diabetes management in China. A meta-analysis of 13 studies and 1,054 participants found both oral and intravenous astragalus effective at lowering blood glucose levels and hemoglobin A1c when added to standard treatment. However, the authors pointed to the limited quality of the included trials [\[R\]](#), [\[R\]](#), [\[R\]](#).

In a non-placebo-controlled trial of 41 pregnant women with gestational diabetes, injected astragalus controlled blood glucose and reduced oxidative damage [\[R\]](#).

128



Bitter Melon Supplement

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take a bitter melon supplement in the form of capsules or tablets, typically ranging from 500 mg to 1000 mg per day, split into two to three doses before meals. It's recommended to follow the dosage instructions on the product label or consult a healthcare provider for personalized advice. Continue for as long as recommended by the healthcare provider, usually a few weeks to months, to monitor effectiveness and tolerance.

TYPICAL STARTING DOSE

500 mg

Description

Bitter melon supplements are often used in traditional medicine for their potential to support blood sugar control. They contain compounds that may help regulate glucose metabolism and promote overall metabolic health.

How it helps

Consuming bitter melon powder (2.5-4.8 g/day) or extract (400-2,000 mg/day) for 1-12 weeks lowered blood glucose (both before and after meals), improved insulin secretion, and reduced insulin resistance in 5 trials (3 of them controlled) of 76 people with prediabetes, 215 with type 2 diabetes, and 42 with metabolic syndrome. However, it was ineffective in 2 trials of 5 overweight men and 40 type 2 diabetes patients [R, R, R, R, R, R, R].

When compared to antidiabetic drugs, bitter melon was as effective as rosiglitazone but less than metformin and glibenclamide in 3 non-placebo-controlled trials of 249 people with type 2 diabetes. Interestingly, it was more effective than glibenclamide at preventing clogged arteries [R, R, R].

 PERSONALIZED TO YOUR GENES

The [TCF7L2](#) gene plays a crucial role in [sugar](#) metabolism and insulin release. It controls the activity of [GLP-1](#), a protein that stimulates the release of insulin. *TCF7L2* has the strongest known association with type 2 diabetes [R, R, R, R, R].

Your genotype for [rs7903146](#) is strongly associated with high blood sugar levels. It may prevent GLP-1 from stimulating insulin release and reducing blood sugar after meals [R, R, R, R].

Bitter melon works by increasing GLP-1, making it a valuable choice for people with *TCF7L2* variants [R, R, R].

>>> To learn more about the link between the *TCF7L2* gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TCF7L2	rs7903146	CT	

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Pilates

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Engage in Pilates exercises for at least 20-30 minutes, 3 times a week. Focus on core strength, flexibility, and mindful breathing. It is suitable for both beginners and advanced individuals, adjusting the difficulty of exercises as necessary.

TYPICAL STARTING DOSE

30 minutes

Description

Pilates is a form of exercise that focuses on strengthening the core, improving flexibility, and enhancing overall body awareness through controlled movements and breathing techniques. Its health benefits include increased core strength, improved posture, enhanced flexibility, and better balance, making it a popular choice for those seeking a holistic approach to fitness.

Pilates is a type of exercise that emphasizes proper alignment, breathing techniques, and precise movements.

It involves a series of controlled movements performed on a mat or with specialized equipment, such as a reformer or Cadillac. Pilates helps strengthen the core muscles, improve flexibility, and promote mind-body awareness.

How it helps

In a non-placebo-controlled trial of 22 women with type 2 diabetes, practicing Pilates for 12 weeks improved functional capacity, postprandial glycemia, and HbA1c levels. In a non-placebo-controlled trial of 44 patients with type 2 diabetes, an 8-week Pilates program improved HbA1c and oxidative stress, but not fasting glucose or lipid profile. Practicing Pilates for 10 weeks lowered blood glucose (by 1.6%) in a non-placebo-controlled trial of 196 overweight or obese women. However, Nordic walking was more effective [\[R\]](#), [\[R\]](#), [\[R\]](#).

130



Kimchi

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate about a half cup of kimchi into one of your daily meals. This could be as a side dish or part of the meal for at least one month to observe potential health benefits such as improved digestion.

Description

Kimchi is a fermented vegetable dish commonly consumed in Korean cuisine. It's packed with probiotics and nutrients, which can promote gut health and boost the immune system.

How it helps

In a non-placebo-controlled trial of 100 healthy volunteers, consuming kimchi (15-210 g/day) for 7 days had a dose-dependent lowering effect on fasting glucose, total glucose, TC, and LDL-C. The lipid-lowering effects of kimchi were stronger in people with TC above 190 mg/dL and LDL-C above 130 mg/dL [\[R\]](#).

In a non-placebo-controlled trial of 22 overweight and obese participants, consuming kimchi (both fresh and fermented) for 4 weeks lowered fasting glucose, fasting insulin, and total cholesterol, especially if fermented [\[R\]](#).

In a non-placebo-controlled trial of 21 prediabetic participants, consuming fermented kimchi for 8 weeks decreased insulin resistance and improved glucose tolerance [\[R\]](#).

In a placebo-controlled trial of 40 prediabetic participants, supplementation with the kimchi-derived probiotic *Lactobacillus plantarum* HAC01 for 8 weeks reduced 2h-PPG and HbA1c levels [\[R\]](#).

131



Quinoa

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate quinoa into your diet by replacing rice or pasta with it in meals. Aim for 1-2 servings, which is about 1/2 to 1 cup cooked, 2-3 times a week to benefit from its high protein, fiber, and mineral content.

Description

Quinoa is a nutrient-rich, gluten-free grain-like seed originating from South America. It is packed with protein, fiber, B-vitamins, vitamins A, C, and E, as well as minerals like calcium phosphorus, iron, and zinc, making it a valuable addition to diets for promoting muscle health, aiding digestion, and providing essential nutrients.

[Quinoa](#) (*Chenopodium quinoa Willd*) is a flowering plant native to The Andes in South America. There, it is a **food staple for indigenous cultures** [\[R\]](#), [\[R\]](#), [\[R\]](#).

Quinoa is famous for its seeds, which are **gluten-free and high in protein**. In comparison with many grains, quinoa seeds have a greater amount of many nutrients, including [\[R\]](#), [\[R\]](#):

- Fiber
- [Fatty acids](#) (e.g., linoleic and α-linolenic acid)
- Vitamins (e.g., B1, B2, B6, C, and E)
- Minerals (e.g., calcium, phosphorus, iron, and zinc)

Quinoa seeds can be used whole or ground to a fine powder and shaped into flakes before use [\[R\]](#).

How it helps

Quinoa is a whole grain that lowered blood glucose in a clinical trial. As opposed to refined grains, which spike your blood sugar and insulin, refined grains are a rich source of fiber that may help manage blood sugar. **Note that a diet high in sugary foods may cancel out the protective effects of whole grains** [\[R\]](#), [\[R\]](#).

132



Sweet Potatoes

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate sweet potatoes into your diet 2-3 times per week, either baked, steamed, or boiled, as a side dish or part of your main meals.

Description

Sweet potatoes are nutritious root vegetables packed with vitamins A and C, fiber, and antioxidants. They contribute to eye health, immune support, and overall nutrition.

Sweet potatoes are a rich source of vitamins, minerals, and antioxidants, including vitamins A, C, B5, and B6, fiber, manganese, and potassium. One potato provides 1,403 mcg of vitamin A or 156%DV.

How it helps

A Cochrane review of 3 trials and 140 participants found that consuming sweet potatoes (4 g/day for 1.5-5 months lowered HbA1c. In a non-placebo-controlled trial of 58 white-collar workers, consuming white sweet potato (132 g/day for 8 weeks) reduced HbA1c by 3.5% [\[R, R\]](#).

Sweet potatoes may help by reducing insulin resistance [\[R\]](#).

133



Probiotic Yogurt

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Consume one to two servings of probiotic yogurt each day. Each serving is typically 6 to 8 ounces. Continue this practice daily for at least 1 to 2 weeks to begin noticing benefits to digestive health.

Description

Probiotic yogurt is a dairy product containing live probiotic cultures like Lactobacillus and Bifidobacterium, which can aid digestion and improve gut health when consumed regularly. It is a good source of calcium, protein, and probiotics, contributing to bone health and digestive well-being.

How it helps

A meta-analysis of 4 trials and 533 participants found a significant association between probiotic yogurt and reduced risk of gestational diabetes mellitus. Furthermore, the mean reduction in the fasting plasma glucose was significantly higher in the probiotic yogurt groups [\[R\]](#).

134



Prickly Pear (Nopal Cactus) Extract

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Take 500 mg of prickly pear extract in capsule form, preferably with water, once daily. This should be done in the morning or before a meal for better absorption. Continue this regimen daily for a period of at least 8 weeks to evaluate its effectiveness.

TYPICAL STARTING DOSE

500 mg

Description

Prickly pear extract is derived from the fruit of the prickly pear cactus and is often used in dietary supplements for its potential to lower blood sugar levels and provide antioxidant protection. This is due to antioxidants like betalains and vitamin E.

How it helps

In 2 non-placebo-controlled trials of 7 healthy people and 40 with type 2 diabetes, consuming prickly pear leaves (nopales) lowered post-meal blood sugar (by up to 48%) and insulin levels [\[R\]](#), [\[R\]](#).

A single dose of prickly pear extract (200-1,000 mg) lowered blood glucose in 2 placebo-controlled trials of 6 healthy men and 29 people with prediabetes [\[R\]](#), [\[R\]](#).

135



Cruciferous Vegetables

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate a serving of cruciferous vegetables, such as broccoli, cauliflower, Brussels sprouts, kale, or cabbage, into at least one meal each day. A serving size is about a half cup cooked or one cup raw. Try to maintain this habit consistently over time for the best health outcomes.

Description

Cruciferous vegetables like broccoli, cauliflower, and kale are rich in vitamins, fiber, and antioxidants. Including them in your diet can promote overall health and may offer cancer-protective properties.

Cruciferous vegetables are a group of vegetables that belong to the Brassicaceae family. They are rich in fiber, vitamins, minerals, and other nutrients.

Some common cruciferous vegetables include broccoli, cauliflower, cabbage, kale, and brussels sprouts.

How it helps

A meta-analysis of 23 studies associated a high intake of cruciferous vegetables with a 7% decreased risk of type 2 diabetes [\[R\]](#).

136



Leafy Green Vegetables

IMPACT2 / 5

EVIDENCE1 / 5

How to implement

Incorporate at least one serving of leafy green vegetables, such as spinach, kale, or Swiss chard, into your diet daily. This can be done by adding them to salads, smoothies, or as a side dish to your meals.

Description

Leafy green vegetables like spinach and kale are packed with vitamins, minerals, and antioxidants. Incorporating them into your diet can promote overall health by providing essential nutrients, supporting digestion, and reducing the risk of chronic diseases like heart disease and certain cancers.

Leafy green vegetables, also called leafy greens, or greens, are edible plant leaves, which can include stalks and shoots as well. Common examples include: lettuce, spinach, kale, chard, endive, and fennel.

Leafy greens contain a host of vitamins and minerals, as well as fiber. Most of them are a particularly good source of vitamin K.

How it helps

A meta-analysis of 23 studies associated a high intake of leafy green vegetables with a lower risk of type 2 diabetes [\[R\]](#).

137



Tomato

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate fresh or cooked tomatoes into your daily diet. This can be achieved by adding them to salads, sandwiches, pastas, and sauces or simply eating them on their own. Aim for at least one serving (approximately 1 medium-sized tomato or 1/2 cup of chopped or cooked tomatoes) per day.

Description

Tomatoes are a fruit grown widely in numerous varieties, and are rich in vitamins C and K, as well as the antioxidant lycopene, which may contribute to heart health and protect against certain chronic diseases when incorporated into a balanced diet.

Tomato (*Solanum lycopersicum*) is a fruit originally from the Andes in South America. It is usually consumed as a vegetable in juices, sauces, or fresh. Tomato is an important source of [\[R\]](#):

- [Vitamin C](#)
- Potassium
- Antioxidants (e.g., [lycopene](#))
- Vitamin B9 ([folate](#))

Tomato is traditionally used for [\[R\]](#), [\[R\]](#):

- High cholesterol
- High blood pressure

How it helps

In a placebo-controlled trial of 20 healthy volunteers, consuming tomato peels together with a regular glucose solution decreased postprandial glucose and insulin peaks. Consuming tomato juice (200 g) 30 min before consuming 200 g boiled rice for 3 days lowered postprandial glucose in a non-placebo-controlled trial of 25 healthy women [\[R\]](#), [\[R\]](#).

Tomatoes are rich in antioxidants and low in carbohydrates, which can help control your blood sugar levels.

138



Pumpkin Seeds

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate a handful of pumpkin seeds (about 28 grams) into your diet daily. You can add them to your breakfast cereal, sprinkle them over a salad, blend them into smoothie bowls, or simply eat them as a snack. This practice can be continued indefinitely as part of a healthy dietary pattern.

Description

Pumpkin seeds, also known as pepitas, are the edible seeds of the pumpkin.They are rich in protein, antioxidants, iron, zinc, magnesium, manganese, and phosphorus. The compounds in pumpkin seeds may benefit heart health and immune function.

Pumpkin seeds are rich in arginine, protein, antioxidants, iron, zinc, magnesium, manganese, and phosphorus. Pumpkin seeds contain 54.18 mg of arginine per gram.

How it helps

In a placebo-controlled trial of 40 normoglycemic adults, the addition of pumpkin seeds (65 g/day for 3 nonconsecutive days) to three high-carbohydrate mixed meals reduced postprandial glycemia [\[R\]](#).

Pumpkin seeds are rich in dietary fiber, which slows down the absorption of sugar into the bloodstream. They also contain magnesium, which may improve insulin regulation.

139



Vitamin K1

IMPACT2 / 5

EVIDENCE1 / 5

How to implement

Take a vitamin K1 supplement once daily with a meal that includes fat, as fat increases its absorption. The dosage can vary depending on individual needs, but a common dose is between 90-300 micrograms. Continue this regimen daily for ongoing health benefits, particularly for bone and cardiovascular health.

TYPICAL STARTING DOSE

90 mcg

Description

Vitamin K encompasses two main forms: vitamin K1 (phylloquinone) and vitamin K2 (menaquinone). Vitamin K1 is primarily found in leafy green vegetables and plays a crucial role in blood clotting. Vitamin K2, sourced from animal products and fermented foods, is known for its potential to promote bone health and cardiovascular wellness.

How it helps

In a placebo-controlled trial of 82 prediabetic women, supplementation with vitamin K1 (1000 µg/day) for 4 weeks lowered 2-h post-oral glucose tolerance test glucose and insulin levels [\[R\]](#).

In a study with 1925 participants, those with lower phylloquinone intake at the beginning had a 17% lower risk of developing type 2 diabetes for every additional 100 µg of phylloquinone daily intake after adjusting for confounders [\[R\]](#).

In a study involving 510 elderly individuals, no significant associations were found between dietary phylloquinone intake and metabolic risk markers at baseline, except for a negative association with plasminogen activator inhibitor-1. However, after 1 year, those with higher changes in phylloquinone intake had notable reductions in various markers, suggesting that increased phylloquinone intake may improve cytokines and markers related to insulin resistance and diabetes [\[R\]](#).

In postmenopausal women, 1 mg daily phylloquinone for 12 months did not impact insulin or glucose metabolism despite lower ucOC levels [\[R\]](#).

In line with this, genetically higher circulating phylloquinone may be causally related to a lower risk of type 2 diabetes [\[R\]](#).

Please note: *Vitamin K can interact with blood thinners (e.g., Coumadin). Make sure to consult your doctor before supplementing with vitamin K or drastically changing your dietary intake.*

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Dietary Vitamin K1

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate foods rich in Vitamin K1 into your daily diet. Include green leafy vegetables like kale, spinach, and broccoli, as well as other sources like soybeans and carrots. Aim for at least one serving of these foods per day to meet the recommended dietary allowance for Vitamin K1.

Description

Vitamin K1, primarily found in leafy green vegetables, is essential for blood clotting and supports overall cardiovascular health. It plays a crucial role in maintaining healthy blood vessels.

How it helps

A study of 510 elderly participants associated high dietary vitamin K1 intake with an improvement of cytokines and other markers related to insulin resistance and diabetes. In line with this, a study of 1920 elderly participants found that the risk of type 2 diabetes decreased by 17% for every additional intake of 100 µg vitamin K1 per day [\[R, R\]](#).

Please note: *Vitamin K can interact with blood thinners (e.g., Coumadin). Make sure to consult your doctor before supplementing with vitamin K or drastically changing your dietary intake.*

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Pears

IMPACT

1 / 5

EVIDENCE

3 / 5

How to implement

Incorporate one medium-sized pear into your daily diet, either as a snack or part of a meal. You can eat it raw, add it to salads, or use it in recipes. Continue this practice daily for ongoing health benefits.

Description

Pears are a fruit that originates from the Pyrus tree, and have been eaten for centuries in various parts of the world. they are a good source of dietary fiber, vitamin C and K, and various antioxidants, which may be beneficial for gut health, help fight inflammation, and aid in weight loss.

How it helps

A meta-analysis of 5 studies and over 228,000 participants found that eating apples and pears was linked to an 18% lower risk of type 2 diabetes, with a 3% risk reduction per weekly serving increase. Similarly, a study of 12,198 participants found that every daily serving of apples or pears reduced the risk of type 2 diabetes by 7%. A meta-analysis of 22 studies identified type 2 diabetes among the diseases whose risk is decreased by apple or pear intake [\[R, R, R\]](#).

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Avoid Cadmium Exposure

IMPACT

1 / 5

EVIDENCE

3 / 5

How to implement

To avoid cadmium exposure, refrain from smoking or exposure to secondhand smoke, reduce consumption of foods high in cadmium like shellfish, liver, kidney meats, and certain leafy vegetables, and use ceramic or glass containers instead of plastic when microwaving food. Limit intake of cadmium-contaminated workplace air by using protective gear if you work in battery manufacturing, welding, or metal refining industries.

Description

Avoiding cadmium exposure is essential to prevent potential health risks associated with this heavy metal, such as kidney damage and increased cancer risk. Reducing exposure to cadmium-containing products and contaminated foods is crucial.

Heavy metals are elements naturally found in the environment. They are also used for agricultural, industrial, and medicinal purposes. Some can even be found in small amounts in your body [\[R\]](#), [\[R\]](#).

Long-term exposure to high amounts of heavy metals can be harmful to your health [\[R\]](#), [\[R\]](#).

Heavy metals that are most often linked to health problems include [\[R\]](#), [\[R\]](#):

- Lead
- Cadmium
- Arsenic
- Chromium
- Mercury

How it helps

Research indicates a positive link between cadmium exposure and diabetes risk. Meta-analyses showed increased risk, ranging from 21% to 47%, for blood, urinary, and toenail cadmium levels. Prediabetes risk was also elevated. Dose-response analyses indicated a positive relationship, with the risk increase reaching 25% at 2.0 µg/g creatinine. However, blood cadmium increased diabetes risk only above 1 µg/L. Another study found a 27% higher risk of diabetes, combining urinary and blood cadmium levels. Urinary cadmium showed a 31% higher risk. Dose-response analysis suggested a 16% diabetes risk increase for each 1 µg/g creatinine rise in urinary cadmium above 2.43 µg/g creatinine. Chronic cadmium exposure in a smelter community was linked to type 2 diabetes. A meta-analysis of nine studies found a 2% increased diabetes risk for each 1 µg/g creatinine increase in urinary cadmium [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Cadmium can damage your pancreas, thus impairing insulin production.

143



Hibiscus

IMPACT1 / 5

EVIDENCE3 / 5

How to implement

Take 250 mg of hibiscus supplement daily, either in the form of a capsule or powder. It can be taken at any time of day, with or without food.

TYPICAL STARTING DOSE
250 mg

Description

Hibiscus is a flower known for its potential to lower blood pressure, boost antioxidant levels, and support heart health. Consuming hibiscus tea or incorporating hibiscus into your diet may provide these health benefits.

[Hibiscus](#) (*Hibiscus sabdariffa*), also known as roselle or sorrel, is a flowering plant. It is traditionally brewed as a tea of a distinctive, bright pink color [\[R\]](#), [\[R\]](#).

For hundreds of years, people from all over the world have taken hibiscus for its potential health benefits [\[R\]](#), [\[R\]](#), [\[R\]](#).

Please note: *Hibiscus can interact with "water pills" (diuretics) like hydrochlorothiazide. If you are using "water pills", consult your doctor before taking hibiscus.*

How it helps

A systematic review and meta-analysis of 8 randomized clinical trials found that *Hibiscus sabdariffa*, taken in various doses for 1-12 weeks, reduced fasting plasma glucose and LDL levels significantly. However, it had no significant impact on total cholesterol, HDL, or triglycerides [\[R\]](#).

Hibiscus may help by improving insulin sensitivity and inhibiting carbohydrate absorption from the diet.

Please note: *Hibiscus may interact with painkillers and anti-inflammatory drugs such as diclofenac and drugs for high cholesterol such as simvastatin. Make sure to consult your doctor before consuming hibiscus* [\[R\]](#), [\[R\]](#).

How to implement

Description

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

How it helps

A study with 41,320 subjects found a link between BPA levels in urine and serum and a 28% higher risk of type 2 diabetes [R].

A meta-analysis of 41 studies found that elevated levels of dioxins, PCBs, chlorinated pesticides, BPA, and phthalates in the body were significantly linked to a higher risk of type 2 diabetes and related glucose and insulin issues [R].

145



Limit Cantaloupe

IMPACT1 / 5

EVIDENCE3 / 5

How to implement

Reduce your intake of cantaloupe to no more than half a cup, roughly 90 grams, once a week. This can help manage the dietary concern without completely eliminating cantaloupe from your diet.

Description

While cantaloupe is a nutritious fruit, limiting intake for individuals with certain dietary restrictions, such as low-carb diets or those monitoring sugar intake, can help maintain blood sugar levels.

How it helps

In a large cohort study spanning several years involving over 120,000 participants, consuming cantaloupe was linked to a slightly higher risk of developing type 2 diabetes. For every 3 servings per week, the risk increased by 10% [\[R\]](#).

Limiting cantaloupe consumption can help manage high blood sugar because this fruit, though nutritious, has a high sugar content.

Please note: Melon allergy is rare. However, *some people may have an allergic reaction after eating melon, especially if they suffer from allergic rhinitis and/or asthma* [\[R\]](#).

146



Stevia

IMPACT1 / 5

EVIDENCE3 / 5

How to implement

Stevia can be consumed as a sugar substitute in both hot and cold beverages, as well as in various recipes requiring sweetening. Aim to use stevia in moderation, adjusting the quantity based on personal sweetness preference and the specific stevia product's sweetness intensity compared to sugar. This adjustment often means starting with a half teaspoon of stevia powder or a few drops of liquid stevia as a starting point and adapting as necessary.

Description

Stevia is a natural sweetener derived from the leaves of the Stevia rebaudiana plant. It is known for its zero-calorie sweetness and is used as a sugar substitute in various foods and beverages, making it a suitable option for individuals looking to reduce their sugar intake.

How it helps

Research on stevia's impact on glycemic responses and appetite varies. In a meta-analysis of 36 trials, stevia-containing beverages had similar post-meal glycemic responses as water. In individual trials, stevia reduced appetite without worsening post-meal glucose levels, and commercial stevia elicited a low glycemic response. However, stevia didn't alter glucose responses in some trials, and in one case, it even increased post-glucose load glucose levels. Another meta-analysis found a non-significant effect on fasting blood glucose levels. Overall, stevia's effects on glucose and appetite are context-dependent and may vary among individuals [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Stevia is a natural sweetener that doesn't raise blood glucose levels, making it a great sugar alternative for people with high blood sugar.

How to implement

TYPICAL STARTING DOSE

500 mg

Description

Cumin (*Cuminum cyminum* L.) is a flowering herb cultivated in the Middle East, India, China, and the Mediterranean area [R].

- Diarrhea
- Stomachache
- High cholesterol
- Diabetes

How it helps

Cumin may help by boosting insulin sensitivity and regulating carbohydrate metabolism. It may directly reduce sugar levels in the blood and slow down the absorption of carbohydrates in the intestine.

148



Cranberry

IMPACT

1 / 5

EVIDENCE

3 / 5

How to implement

Consume one to two 8-ounce servings of unsweetened cranberry juice daily, or take 500 mg of cranberry supplements twice daily. Continue this practice consistently for at least several weeks to potentially observe benefits.

Description

Cranberries are known for their high antioxidant content and potential to promote urinary tract health by preventing bacterial adhesion. Consuming cranberries or cranberry products may help reduce the risk of urinary tract infections and provide antioxidant benefits.

Cranberries are fruits rich in vitamins, minerals, and antioxidants. They are available in different forms, including [\[R\]](#):

- Dried fruits
- Juice
- Powder
- Pills

How it helps

A meta-analysis of 22 studies concluded that consuming cranberries reduces fasting glucose (by 17.72 mg/dL) and HbA1c (by 0.32%). However, two other meta-analyses failed to find this benefit of cranberries [\[R, R, R\]](#).

Cranberries are rich in fiber that can slow the absorption of sugars into the bloodstream. Because they are also rich in sugars, they must be consumed in moderation.

149



Taurine

IMPACT

1 / 5

EVIDENCE

2 / 5

How to implement

Take 1-4 g of taurine supplement daily, divided into two or three doses with meals for optimal absorption. It can be taken continuously, with periodic evaluations of its effects and benefits.

TYPICAL STARTING DOSE

500 mg

Description

Taurine is an amino acid found in various foods and often used in energy drinks and supplements. It plays a role in neurological and cardiovascular health and can help support energy metabolism.

[Taurine](#) is the most abundant free amino acid in humans. It's not essential, which means we can produce it. We can also get it from protein-rich foods, such as [\[R\]](#):

- Seafood
- Meat
- Dairy

Taurine is a popular additive in energy drinks and can also be taken as a supplement [\[R\]](#).

Taurine plays an important role in [\[R\]](#), [\[R\]](#):

- Bile production
- Calcium metabolism

It is also well-known for its antioxidant and anti-inflammatory properties [\[R\]](#).

How it helps

Taurine supplementation (3000 mg/day) for 8 weeks improved glucose, insulin, and insulin resistance in type 2 diabetes patients, with mixed results in HbA1c. Combining taurine with resistance training was most effective in lowering insulin resistance and glucose. However, taurine (1.5 g/day) had no impact on insulin in nondiabetic subjects. Overall, a meta-analysis found no effect on fasting glucose [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

How to implement

Description

- Lead
- Cadmium
- Arsenic
- Chromium
- Mercury

How it helps

Heavy metals may impair the body's ability to produce or use insulin.

151



Berries

IMPACT

1 / 5

EVIDENCE

2 / 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

A meta-analysis of 23 trials found that fruits, especially berries, reduce the risk of type 2 diabetes. Consuming berries lowers fasting glucose (by 0.10 mmol/L) and HbA1c (by 0.2%) according to a meta-analysis of 28 trials. However, another meta-analysis found no effects of anthocyanin-rich berries on any metabolic syndrome parameters [\[R, R, R\]](#).

152



Avoid Secondhand Smoke

IMPACT

1 / 5

EVIDENCE

2 / 5

How to implement

Implementing a smoke-free lifestyle involves communicating your needs to family, friends, and coworkers, requesting they respect your choice by smoking away from you. At home, establish strict no-smoking policies indoors. When out, choose smoke-free venues and accommodations. Advocate for smoke-free environments in your community and support legislation that promotes public health by reducing exposure to secondhand smoke. Utilize air purifiers at home to reduce any residual particles.

Description

Avoiding secondhand smoke is crucial for maintaining good health. Exposure to secondhand smoke can lead to respiratory problems, cardiovascular disease, and an increased risk of lung cancer, even in non-smokers. Protecting oneself from secondhand smoke involves staying away from smoking areas, ensuring smoke-free environments at home and work, and advocating for smoke-free policies in public spaces.

How it helps

Cigarette smoke raises blood sugar by causing [oxidative stress](#). It can also increase [cortisol](#) and other hormones that are linked to high blood sugar [\[R, R, R\]](#).

Smokers are more likely to have diabetes than non-smokers. Secondhand smoke may also increase blood sugar, especially in people older than 27 [\[R, R\]](#).

All health experts agree that smoking increases the risk of diabetes and its complications [\[R, R, R\]](#).

When you quit smoking, your blood sugar may rise for the first couple of years. However, after about 3 years, it should gradually drop [\[R\]](#).

Make sure to monitor your blood sugar levels closely for the first 3 years after you quit smoking. Follow other suggestions from this report to help control your blood sugar.

153

Avoid PFAS Exposure

IMPACT1 / 5

EVIDENCE2 / 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 310 adolescents at risk of type 2 diabetes associated PFHxS exposure with dysregulated glucose metabolism in females [R].

A study of 4575 patients with type 2 diabetes associated high serum levels of PFNA and PFHxS with poor glycemic control in both sexes, while PFDeA was associated only in men [R].

However, a study of 757 adolescents found a negative association between PFAS, especially PFHxS, and insulin resistance and insulin levels [R].

Another study (2373 participants) found an inverse association between PFOA levels and type 2 diabetes and glucose levels [R].

A study of 102 young adults associated high exposure to PFOA with higher 30-minute glucose levels and glucose area under the curve during an oral glucose tolerance test [R].

A study of 571 participants associated chronic PFOS exposure with impaired glucose tolerance and increased prevalence of diabetes. However, PFOA, PFNA, and PFUA showed a potential protective effect [R].

PERSONALIZED TO YOUR GENES

Prenatal exposure to PFAs may worsen blood glucose control more in people with your [PPARG](#) gene variant [R].

Prenatal exposure to PFAs may worsen blood glucose control more in people with your [SLC12A3](#) gene variant [R].

Prenatal exposure to PFAs may worsen blood glucose control more in people with your [ABCA1](#) gene variant [R].

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
PPARG	rs17036314	CC	
HERPUD1	rs2289116	GG	
ABCA1	rs3890182	GG	

154



Raisins

IMPACT

1 / 5

EVIDENCE

2 / 5

How to implement

Incorporate a small handful of raisins (about 1/4 to 1/2 cup) into your diet daily. You can add them to oatmeal, yogurt, or salads, or enjoy them as a stand-alone snack.

Description

Raisins are dried grapes rich in natural sugars, fiber, potassium, iron, and antioxidants. They serve as a convenient and nutritious snack option, providing energy and promoting digestive regularity.

Raisins are a good source of fiber, B-vitamins, potassium, manganese, copper, iron and magnesium. A ½ cup serving provides 618 mcg or 13%DV.

How it helps

A meta-analysis of 29 trials and 1,297 participants concluded that the intake of grapes and their products such as raisins lower insulin resistance, but not fasting glucose, insulin, or HbA1c [\[R\]](#).

155



Guarumo (Trumpet)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take guarumo (trumpet tree) supplements in capsule form, typically available in 500mg doses. Consume one capsule twice daily, with water, preferably 30 minutes before meals. Continue this regimen for up to 3 months, then take a one-week break before resuming if needed.

Description

Guarumo, also known as Cecropia, is a traditional medicinal plant used for various purposes, including digestive and respiratory health, inflammation, and blood sugar control.

How it helps

Drinking tea prepared from guarumo leaves for 3-32 weeks reduced fasting blood glucose (by 15.25%) and glycated hemoglobin levels (by 13%) in 2 trials (1 of them placebo-controlled) of 55 people with type 2 diabetes [\[R\]](#), [\[R\]](#).

Guarumo may help by slowing down carbohydrate breakdown.

156



Ecklonia Cava

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a supplement of Ecklonia Cava extract, typically available in capsule format, with a standard dose ranging between 100-400 mg daily. It can be taken with or without food, but consistency in timing can help maintain stable levels in your body. It's generally recommended to start with the lower end of the dosing spectrum and adjust based on personal tolerance and efficacy. Continue taking daily for at least a few weeks to gauge the full effect.

TYPICAL STARTING DOSE

100 mg

Description

Ecklonia cava is a type of brown seaweed often used in supplements for its potential antioxidant and anti-inflammatory properties, which may support cardiovascular health and overall well-being.

Ecklonia cava, also known as “sea trumpet”, is a brown seaweed that grows along the coasts of Korea and Japan. People use it as a food, fertilizer, and supplement [\[R\]](#), [\[R\]](#).

Ecklonia cava is traditionally used to fight [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Urinary diseases
- Hemorrhoids
- Constipation

How it helps

Supplementation with *Ecklonia cava* extract (150-1,500 mg/day for 12 weeks) may decrease blood sugar levels. Ecklonia cava may help by improving insulin sensitivity [\[R\]](#), [\[R\]](#).

157



Safflower Oil

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate safflower oil into your diet by using it as a cooking oil for sautéing or frying, or add it to salad dressings and dips. Aim for about 1-2 tablespoons daily. Keep in mind, like all oils, safflower oil is high in calories, so use it in moderation within a balanced diet.

Description

Safflower oil is a cooking oil derived from the safflower plant's seeds. It is known for its heart-healthy properties, as it is high in monounsaturated fats and low in saturated fats.

How it helps

Taking safflower oil (8 g/day) for 16 weeks decreased fasting blood glucose in a placebo-controlled trial of 55 obese, postmenopausal women with type 2 diabetes [\[R\]](#).

In test tubes, safflower oil inhibited an enzyme that breaks down starch into simple sugars (alpha-amylases). Safflower oil may thus reduce the amount of sugars the gut absorbs from food starches, leading to fewer spikes in blood sugars after meals [\[R\]](#).

158



Meditation

IMPACT1 / 5

EVIDENCE1 / 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

In a non-placebo-controlled trial of 60 people with coronary artery disease, practicing meditation for 6 months reduced blood glucose, HbA1c, and fasting insulin levels. A 12-week walking Buddhist meditation intervention reduced HbA1c and blood pressure in a non-placebo-controlled trial of 23 people with type 2 diabetes [\[R\]](#), [\[R\]](#).

159



Kelp

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a kelp supplement daily, ensuring the dosage aligns with the product's label, typically ranging from 600 to 1000 micrograms of iodine. It's important to not exceed the recommended dosage to avoid potential thyroid issues. Use for ongoing nutritional support, especially if your diet lacks iodine.

TYPICAL STARTING DOSE

500 mg

Description

Kelp is a type of seaweed rich in iodine and other minerals. Incorporating kelp into the diet may help support thyroid function and provide essential nutrients.

Kelp is a source of iodine, vitamins K, A, C, E, and B-vitamins, along with some thiamin, riboflavin, and niacin. The highest type is kombu kelp, which contains 2,984 mcg of iodine per seaweed sheet (1 gram).

How it helps

In a placebo-controlled trial of 20 healthy participants, consuming 30 g starch with 5 g kelp lowered postprandial blood glucose, insulin, C-peptide response, and appetite sensation [R].

Kelp is rich in iodine, which helps regulate thyroid function. This may ultimately regulate metabolism and influence blood sugar levels.

160



Red Clover

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a red clover supplement in the form of capsules, typically ranging from 40 to 80 milligrams daily. This should be done under the guidance of a healthcare provider, especially if you're using it for menopausal symptoms or bone health, to ensure it's appropriate for your individual needs. Generally, it's used for periods ranging from 3 to 12 months.

TYPICAL STARTING DOSE

40 mg

Description

Red Clover is a plant that's often utilized for its health benefits. Not just pleasing to the eyes with its bright color, it's known to help with skin health and menopause symptoms. Additionally, it may improve heart health and bone density. It's like a power-plant, offering multiple health benefits in one package.

How it helps

In a placebo-controlled trial of 36 participants, supplementation with red clover extract (1.9 g/day for 8 weeks) lowered fasting insulin (by 0.75 μ IU/mL), blood glucose (especially in those older than 50 years old), and HbA1c (from 5.36 to 5.28% in those older than 50 years old) [R].

In a placebo-controlled trial of 43 postmenopausal women, supplementation with red clover (40-80 mg/day) for 3 months decreased insulin sensitivity without affecting SHBG levels [R].

However, red clover isoflavones (86 mg/day for 3 cycles) did not affect insulin resistance in a placebo-controlled trial of 25 premenopausal women [R].

161



Caper Fruit Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 400-600 mg of caper fruit extract daily, in capsule form, preferably with meals to aid absorption. Continue this supplementation daily for at least 8-12 weeks to assess benefits.

TYPICAL STARTING DOSE

400 mg

Description

Caper fruit extract is sometimes used for its potential antioxidant properties and mild diuretic effects. It may have benefits for overall health, but research is ongoing.

How it helps

In 2 placebo-controlled trials of 84 people with type 2 diabetes, consuming caper fruit extract (1,200 mg/day for 2 months or 30 mL/day for 3 months) significantly reduced blood glucose and HbA1c without causing any adverse effects [R, R].

162



Iyengar Yoga

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Attend a 90-minute Iyengar yoga class at least once a week. Choose a class led by a certified Iyengar yoga instructor to ensure proper guidance and technique adherence.

TYPICAL STARTING DOSE

1 hour

Description

Iyengar yoga is a style of yoga that emphasizes proper alignment and the use of props to support poses. It can help improve flexibility, balance, and mental well-being through precise and controlled movements.

How it helps

In a non-placebo-controlled trial of 48 patients with type 2 diabetes, practicing Iyengar yoga 2x/week for 12 weeks lowered HbA1c while improving diabetes self-care, quality of life, and emotional distress [R].

163



Bilberry Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 160mg of bilberry extract twice daily with water, preferably with meals. Continue this regimen for at least 3 months to observe potential benefits.

Description

Bilberry extract is a concentrated form of bilberry, containing higher levels of its beneficial compounds. It's used in supplements and herbal remedies for its potential to promote eye health and circulation.

[Bilberry](#) (*Vaccinium myrtillus*) is a bush native to parts of Europe, Asia, and North America. Its fruit looks like the blueberry, which is likely why it is sometimes called the European blueberry. However, it is higher in antioxidants and has darker flesh than blueberries [R, R, R].

People use bilberries to support eye and blood vessel health [R, R].

How it helps

Consuming bilberry extract (0.47-1.5 g/day) for 8-12 weeks lowered fasting and postprandial glucose, insulin, and HbA1c in 2 placebo-controlled trials of 45 people with or at risk of type 2 diabetes [R, R].

Bilberry's anthocyanosides may help lower blood sugar by improving insulin production and sensitivity.

164



Prickly Pear (Nopal Cactus)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate prickly pear into your diet by eating the fruit raw, grilling or boiling the pads (nopales) as a vegetable side dish, or adding them to smoothies. Aim to consume prickly pear 2-3 times per week for ongoing health benefits.

Description

Prickly pear, a plant native to North and South America. Its pads and fruit are rich in nutrients like vitamin C and fiber. Prickly pear oil and extracts are valued for their high content of antioxidants, such as betalains and vitamin E, which benefit skin health. Prickly pear supplements are utilized for their potential health benefits, including blood sugar control and cholesterol reduction.

How it helps

In 2 non-placebo-controlled trials of 7 healthy people and 40 with type 2 diabetes, consuming prickly pear leaves (nopales) lowered post-meal blood sugar (by up to 48%) and insulin levels [\[R, R\]](#).

A single dose of prickly pear extract (200-1,000 mg) lowered blood glucose in 2 placebo-controlled trials of 6 healthy men and 29 people with prediabetes [\[R, R\]](#).

165



Buckwheat

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate buckwheat into your diet by adding it to meals 2-3 times per week. You can use buckwheat flour for pancakes or bread, include buckwheat groats in soups, salads, or as a side dish instead of rice or pasta.

Description

Buckwheat is a gluten-free whole grain that provides essential nutrients, including protein, fiber, and minerals. It can contribute to heart health, digestive regularity, and balanced nutrition.

How it helps

A study of 3542 participants associated consuming buckwheat seeds as a staple food with lower rates of hyperglycemia (1.56% compared to 7.7% in those consuming corn) [\[R\]](#).

Buckwheat has a low glycemic index and is rich in fiber.

166



Walking Meditation

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Dedicate 10-20 minutes daily to practice walking meditation, ideally in a quiet space where you can walk back and forth. Focus on the sensation of each step, maintaining a slow pace that allows you to be fully aware of the movement and feeling in your feet and body. It can be done indoors or outdoors.

TYPICAL STARTING DOSE

30 minutes

Description

Walking meditation is a mindfulness practice that combines the physical activity of walking with focused awareness and deep breathing. It is used to reduce stress, enhance mental clarity, and cultivate mindfulness.

How it helps

In a non-placebo-controlled trial of 23 patients with type 2 diabetes, practicing Buddhist walking meditation (30 min, 3x/week for 12 weeks) increased maximal oxygen consumption and FMD while decreasing fasting glucose, HbA1c, blood pressure, and arterial stiffness [R].

Walking meditation combines physical activity and mindfulness, which can help regulate high blood sugar. Regular walking lowers blood sugar levels and improves insulin sensitivity, while meditation reduces stress, a known factor in blood sugar spikes.

167



Apples

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate at least one whole apple into your daily diet, either as a snack or part of your meals, ensuring to eat them consistently every day for an ongoing period to derive potential health benefits.

Description

Apples are a nutritious fruit known for their fiber content and antioxidant-rich skin. They support overall health by aiding digestion, reducing the risk of chronic diseases, and promoting heart health.

Apples (*Malus domestica Borkh.*) are one of the most widely consumed fruits in the world. They have a high nutritional value and content of antioxidants [\[R, R\]](#).

Eating apples is associated with a lower risk of [\[R, R\]](#):

- Heart disease
- Asthma
- Diabetes

How it helps

A meta-analysis of 5 studies and over 228,000 participants found that eating apples and pears was linked to an 18% lower risk of type 2 diabetes, with a 3% risk reduction per weekly serving increase. However, a meta-analysis of 22 studies found that apples decreased BMI but had no effect on blood glucose [\[R, R\]](#).

In a non-placebo-controlled trial of 18 healthy women, consuming an apple before rice significantly reduced post-meal glucose response by 50%, its peak value by 51.4%, and glycemic excursion by 52.6%. Similarly, a study of 21 healthy subjects found that dried apples lowered post-prandial glucose levels compared to muffins [\[R, R\]](#).

168



Carnosine

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take 500 mg of carnosine twice daily with meals. Continue this regimen for at least 2 to 4 weeks to start noticing benefits. It can be taken as a capsule or powder form mixed with water or juice.

TYPICAL STARTING DOSE

1000 mg

Description

Carnosine is a naturally occurring compound found in muscle tissues and certain foods. It is believed to have antioxidant properties and may support muscle function and overall cellular health.

[Carnosine](#) (β -alanine-l-[histidine](#)) is a compound naturally produced by the body. We also get it from eating meat and fish. Carnosine is abundant in our [\[R\]](#), [\[R\]](#):

- **Muscles**
- Heart
- Brain
- Nose

Carnosine has several important functions in the body, including [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Being an antioxidant
- Improving muscle function
- Removing toxic metals

During exercise, **carnosine may prevent muscle fatigue and boost athletic performance**. It may also help improve sugar metabolism [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

A meta-analysis of 4 trials concluded that supplementation with carnosine lowers HbA1c but not fasting glucose or insulin resistance. Another meta-analysis of 4 trials did find beneficial effects of carnosine on fasting glucose, insulin resistance, and fasting insulin as well as HbA1c [\[R\]](#), [\[R\]](#).

169



Bay Leaf

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate 1 to 2 whole dried bay leaves into your cooking by adding them to soups, stews, or pasta sauces. Remember to remove the bay leaves before serving, as they can be a choking hazard and are not meant to be eaten whole.

Description

Bay leaves are aromatic herbs used in cooking and traditional medicine. They may have anti-inflammatory and antioxidant properties and are often added to dishes for flavor and potential health benefits.

How it helps

In a placebo-controlled trial of 40 people with type 2 diabetes, consumption of capsules containing ground bay leaves (1-3 g/day) for 30 days reduced blood glucose by 21-26% [\[R\]](#).

Similarly, cookies containing 6% bay leaf powder significantly reduced blood glucose spikes after meals in a placebo-controlled trial of 20 healthy volunteers [\[R\]](#).

170



Nectarines

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate nectarine supplements into your diet by taking a standardized nectarine extract supplement daily. Follow the dosage guidelines provided on the supplement's packaging, which typically range from 250 to 500 mg. It's important to continue this practice consistently for at least 8 to 12 weeks to fully gauge its effects.

TYPICAL STARTING DOSE

250 mg

Description

Nectarines are a delicious and nutritious fruit that provides essential vitamins, fiber, and antioxidants, supporting overall health, digestion, and skin vitality when incorporated into a balanced diet.

How it helps

In a placebo-controlled trial of 20 healthy volunteers, consuming polyphenolic extract of nectarines together with a regular glucose solution decreased postprandial glucose and insulin peaks [\[R\]](#).

Nectarines have a low glycemic index and contain fiber, which can slow the absorption of sugar into your bloodstream and prevent spikes in blood glucose. However, they should be consumed in moderation as part of a balanced diet due to their natural sugar content.

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Choline Supplements

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take choline supplements at a dosage of 425 mg to 550 mg daily, depending on age and gender, with a glass of water. It is best to consume choline supplements with a meal for optimal absorption. Continue this regimen daily as part of your dietary supplement routine.

TYPICAL STARTING DOSE

425 mg

Description

Choline is an essential nutrient that plays a crucial role in various bodily functions, including brain health, liver function, and metabolism. Incorporating choline-rich foods into your diet supports cognitive function and overall nutritional well-being.

[Choline](#) is a nutrient required for optimal health. Although the body makes some, we need to get choline from our diets to avoid deficiency [\[R\]](#).

It plays key roles in supporting [\[R\]](#), [\[R\]](#):

- DNA production
- Cell structure and function
- Brain, nerve, and heart health

Eggs and beef liver are the best sources of choline. If you can’t meet your daily requirements with food, consider taking a choline supplement such as [\[R\]](#):

- [Phosphatidylcholine](#) (PC)
- [Citicoline](#) (CDP-choline)
- [Alpha-GPC](#)
- [Lecithin](#)

They all supply choline, but each one has unique health perks you may prefer. Check out our posts on different choline-containing supplements to find out which one suits you best.

How it helps

A study associated high genetically predicted total choline and phosphatidylcholine levels with lower rates of type 2 diabetes. However, another study found the opposite result [\[R\]](#), [\[R\]](#).

172



Avoid Long Naps

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Limit your daily naps to 20-30 minutes. Try to nap before 3 pm to avoid interfering with nighttime sleep.

Description

Limiting long naps during the day can help improve nighttime sleep quality and reduce the risk of sleep disturbances. Shorter naps are generally more beneficial for enhancing daytime alertness without interfering with nighttime rest.

How it helps

A meta-analysis of 10 studies involving 304,885 individuals associated napping with a 31% increased risk of diabetes when naps exceeded 1 hour/day, while no such risk was seen with shorter naps (<1 hour/day) [R].

Another meta-analysis of 7 studies with 249,077 participants showed habitual nappers had a 17% higher risk of type 2 diabetes. The risk increased by 11% for every 30-minute increment in daytime napping [R].

Among 12,663 Chinese participants, napping for ≥91 minutes was linked to a 23% higher risk of type 2 diabetes, particularly in females aged 45-54. Longer napping correlated with greater risk, especially in this group [R].

A dose-response meta-analysis involving 288,883 subjects revealed a 46% increased risk of type 2 diabetes for long naps (≥60 min/day) and a two-fold risk for excessive daytime sleepiness. Short naps (<60 min/day) showed no significant association [R].

Long naps can disrupt your sleep cycle, leading to the body's ineffectiveness in regulating blood sugar levels.

173



Infrared Light Therapy

IMPACT

1 / 5

EVIDENCE

1 / 5

Description

Infrared light therapy is a type of light therapy that uses infrared light to improve circulation, reduce pain, and promote healing. It has been shown to be effective in treating a variety of conditions, including arthritis, chronic pain, and wound healing.

How it helps

In a study of 10 type 2 diabetic patients, infrared light therapy helped lower blood glucose levels. The authors hypothesized that infrared radiation might reduce insulin resistance and lower cortisol levels. This has yet to be determined [R].

In another study of 15 middle-aged type 2 diabetes patients, three months of far-infrared sauna therapy improved the patients’ quality of life. The patients also reported an improvement in fatigue, stress, and physical and emotional health. This study was small and had other design-related limitations. More research is needed [R].

174



Beta-Alanine

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 2-3 grams of beta-alanine supplement daily, ideally in divided doses throughout the day to minimize potential skin tingling sensations. This supplementation can be continued for at least 4 weeks to observe benefits in exercise performance and muscle endurance.

TYPICAL STARTING DOSE

2 g

Description

Beta-alanine is an amino acid that can enhance muscle endurance by increasing the body's buffering capacity against lactic acid accumulation during intense exercise. Supplementing with beta-alanine may help improve athletic performance and delay muscle fatigue.

How it helps

Twenty studies, including 4 on humans and 16 on rodents, examined carnosine or beta-alanine supplementation. Evidence suggests it reduces fasting glucose, HbA1c, HOMA-IR, and fasting insulin in both humans and rodents with moderate certainty [R].

175



Bergamot

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 500-1000mg of bergamot extract supplements once daily, preferably in the morning with a meal for better absorption.

Description

Bergamot is a citrus fruit known for its aromatic peel, which is used to make essential oils and flavorings. It is sometimes used in aromatherapy and may have potential mood-enhancing effects when diffused or applied topically.

Bergamot (*Citrus bergamia*) is a bitter citrus fruit native to southern Italy. The fruit is inedible due to its sour taste. The peel is used to make essential oil, and the juice is used to make extracts. People use bergamot in food, supplements, and cosmetics [R].

How it helps

In a placebo-controlled trial of 60 patients with type 2 diabetes, a new phytosomal formulation of bergamot polyphenol extract was as effective as the traditional form at lowering fasting glucose but its absorption was 2.5-fold higher [R].

Bergamot contains flavonoids that may help lower high blood sugar levels by improving how your body metabolizes glucose and insulin. Additionally, its antioxidant properties could potentially reduce oxidative stress linked to high blood sugar.

176



Yoga Nidra

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Practice Yoga Nidra for 30-45 minutes per session. Choose a quiet, comfortable place where you won't be disturbed. Aim to do this 3-5 times a week, preferably in the evening before bed to help improve sleep quality and reduce stress.

TYPICAL STARTING DOSE

30 minutes

Description

Yoga nidra is a guided meditation and relaxation practice that originates from yoga traditions. It is used for reducing stress, improving sleep quality, and promoting mental relaxation, often involving deep introspection and heightened awareness.

How it helps

In a non-placebo-controlled trial of 41 patients with type 2 diabetes, practicing yoga nidra (30 min/day) for 90 days lowered fasting glucose (by 21.3 mg/dL) and postprandial glucose (by 17.95 mg/dL) [R].

177



Skullcap

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take 1 to 2 grams of dried skullcap herb in capsule or tablet form, or 1 to 2 milliliters of a tincture three times daily. For standardized extracts, follow the specific dosage instructions on the product label.

TYPICAL STARTING DOSE

1 g

Description

Skullcap, also known as Scutellaria, is a herbaceous plant native to North American and Asia. Its extract is often used in traditional herbal medicine for its calming and anti-inflammatory properties. Skullcap extracts may contain various compounds, including flavonoids and polyphenols.

American [skullcap](#) (*Scutellaria lateriflora*) is a Native American herb traditionally used for [\[R\]](#):

- Anxiety
- Stress
- Insomnia

How it helps

In a placebo-controlled trial of 17 patients with type 2 diabetes taking metformin, supplementation with skullcap (3.52 g/day) for 8 weeks decreased plasma glucose after an oral glucose tolerance test [\[R\]](#).

Skullcap may help your body use insulin more effectively, which reduces glucose levels in the bloodstream.

178



Neem

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 300-500 mg of neem extract daily with water, preferably after a meal. Do this for up to 10 weeks to help manage conditions like gastric ulcers and skin health. Always consult with a healthcare provider before starting any new supplement regimen.

TYPICAL STARTING DOSE
300 mg

Description

Neem is a medicinal plant from the mahogany family of trees, known for its antibacterial and anti-inflammatory properties, often used in skincare and herbal remedies to alleviate skin conditions, support oral health, and promote overall well-being.

Neem (*Azadirachta indica*) is a member of the mahogany family of trees. It is native to parts of Asia [\[R\]](#).

Neem may help support gum health and improve ulcers [\[R\]](#).

How it helps

In a placebo-controlled trial of 80 patients with metabolic syndrome, supplementation with neem leaf and twig extract (125-500 mg/day) for 12 weeks improved fasting blood glucose, postprandial blood sugar, insulin resistance, and HbA1c, as well as endothelial function and most markers of inflammation and oxidative stress [\[R\]](#).

Neem may help by improving insulin sensitivity and promoting the health of the pancreatic cells that produce insulin.

179



Dietary Vitamin E

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Incorporate foods high in Vitamin E into your daily diet. This includes almonds, hazelnuts, sunflower seeds, and green leafy vegetables such as spinach and broccoli. Aim for a daily intake of 15mg of Vitamin E from your diet, which is roughly a handful of almonds (about 23 almonds) or 2 tablespoons of sunflower seeds.

Description

Dietary vitamin E is a fat-soluble antioxidant vitamin found in nuts, seeds, and vegetable oils. It helps protect cells from oxidative damage and supports immune function.

[Vitamin E](#) is an antioxidant important for the immune system and for heart health [\[R\]](#).

Plant-based foods have the most vitamin E. These include [\[R\]](#):

- Wheat germ
- Sunflower seeds
- Almonds
- Plant oils

Adults need about **15 mg** of vitamin E per day [\[R\]](#).

How it helps

A study of 4,304 people associated high dietary intake of vitamin E with a 31% reduced incidence of type 2 diabetes [\[R\]](#).

However, the effectiveness of vitamin E supplementation is less clear. A meta-analysis of 14 trials and 714 participants found that vitamin E may lower HbA1c and fasting insulin levels only in those with vitamin E deficiency and concluded that the evidence to support supplementation was insufficient [\[R\]](#).

180



Mustard

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate mustard as a supplement by adding 1-2 teaspoons of ground mustard seeds to your daily diet. You can sprinkle it over salads, add it to dressings, or mix it into warm water to drink. Do this consistently every day.

Description

Mustard is a condiment made from the seeds of the mustard plant and is commonly used to enhance the flavor of various dishes. Mustard seeds contain compounds like antioxidants and omega-3 fatty acids, which may support heart health and possess anti-inflammatory properties.

How it helps

In a non-placebo-controlled trial of 10 healthy men, adding mustard bran (5 g) to a test meal reduced postprandial glycemic responses [\[R\]](#).

Mustard helps your body use insulin more effectively, which can decrease glucose in the blood.

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Lactobacillus Rhamnosus

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a probiotic supplement containing Lactobacillus rhamnosus. Typically, the suggested dose is 10 billion CFUs (colony-forming units) per day. This can be taken as a single daily dose or divided into two doses, morning and evening, with or without food. Continue this regimen for at least 4 weeks to observe benefits.

TYPICAL STARTING DOSE

10 billion CFU

Description

Lactobacillus rhamnosus is a beneficial probiotic strain that can support digestive health and contribute to a balanced gut microbiome. It may help improve gut function, enhance nutrient absorption, and bolster the immune system, promoting overall well-being.

[Lactobacillus rhamnosus](#) is a [probiotic](#) bacterium, part of the normal gut microflora. Various foods may have added *L. rhamnosus*, including yogurt, cheese, and fermented legumes [\[R, R\]](#).

People take *L. rhamnosus* supplements to balance their immune system and help with infections, allergies, and dermatitis [\[R\]](#).

How it helps

In a 90-day placebo-controlled trial on healthy adults, supplementation with *L. rhamnosus* GG prevented an increment in HbA1c that did occur in the placebo group [\[R\]](#).

In a study of 33 participants with prediabetes, those who underwent intermittent fasting and received daily supplementation with *L. rhamnosus* HN001 showed a significant reduction in HbA1c over 12 weeks. This intervention also resulted in an average weight loss of 5% [\[R\]](#).

In a placebo-controlled trial of pregnant women with a personal or partner history of atopic disease, supplementation with *L. rhamnosus* for 14-16 weeks reduced gestational diabetes rates, particularly among women aged at least 35 years and those with a past history of this condition [\[R\]](#).

 PERSONALIZED TO YOUR GENES

[HLA-C](#) and other *HLA* genes help make immune proteins involved in various autoimmune conditions, including type 1 diabetes. According to limited research, HLA-associated inflammation may impair [blood sugar](#) control [\[R, R, R\]](#).

Your genotype for [rs2844623](#) ('CC'; *homozygous major*) has been correlated with higher blood sugar levels — possibly due to increased HLA activity [\[R\]](#).

[Probiotics](#) may improve different inflammatory conditions, partly due to their ability to inhibit HLA proteins [\[R, R, R\]](#).

>>> To learn more about the link between the HLA genes and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
HLA-C	rs2844623	CC	

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Eriocitrin

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 500 mg of eriocitrin supplement daily, with food or water. Continue this regimen for at least 8 weeks to evaluate its effects on your body.

TYPICAL STARTING DOSE
500 mg

Description

Eriocitrin is a flavonoid antioxidant found in citrus fruits, particularly lemon and lime. It has potential anti-inflammatory and antioxidant properties and may contribute to the health benefits associated with citrus consumption, such as improved immune function and skin health.

How it helps

In a study with 30 subjects, Eriomin (200 mg/day) improved glycemic control by reducing blood glucose, insulin resistance, inflammation, and triglycerides, while increasing GLP-1. Placebo had fewer effects [\[R\]](#).

In a study with prediabetic patients, Eriomin at different doses (200, 400, and 800 mg) showed consistent effects, reducing various health markers including blood glucose, insulin resistance, inflammation, and improving factors like GLP-1 and antioxidant capacity [\[R\]](#).

Eriocitrin has been found to improve insulin sensitivity. Additionally, it may aid in preventing oxidative stress, a key contributor to high blood sugar-related complications.

183



Horsetail

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take horsetail as a supplement in capsule form, usually available in doses ranging from 300 to 500 mg. Consume it once or twice daily, with meals to minimize the risk of stomach upset. It's recommended to cycle the supplement, taking it for 4 weeks followed by a 1-week break to prevent possible side effects.

TYPICAL STARTING DOSE
300 mg

Description

Horsetail is an herb rich in silica, which is important for bone health and may contribute to improved hair, skin, and nail condition. It is sometimes used as a dietary supplement to support these aspects of overall well-being.

How it helps

In a placebo-controlled trial of 33 patients with type 2 diabetes, supplementation with horsetail extract (0.33 g/kg) reduced blood glucose within 90-180 min [\[R\]](#).

184



Colostrum

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take colostrum supplements orally, typically 20 to 60 grams daily, split into two to three doses. It is recommended to start with a lower dose and gradually increase as needed. This supplement can be taken for varying durations, from a few weeks to several months, depending on the health goals and responses observed.

TYPICAL STARTING DOSE

20 g

Description

Colostrum is the first milk produced by mammals, including humans, after giving birth. It is rich in nutrients and antibodies and is believed to support newborns' immune systems and overall health.

Colostrum, or “first milk,” is the very first type of milk produced right after a mammal gives birth. It supports the newborn’s immune system and provides a rich source of nutrients and growth factors [\[R\]](#).

People take colostrum to boost immunity and exercise performance [\[R\]](#).

How it helps

In an uncontrolled trial of 16 people with type 2 diabetes, colostrum (5 g/day) supplementation on an empty stomach for 4 weeks lowered blood glucose, cholesterol, ketones, and triglyceride levels. Similarly, tablets with goat colostrum (300 mg, 4x/day) reduced blood sugar and the required insulin dose in an uncontrolled trial of 27 people with type 1 diabetes [\[R\]](#), [\[R\]](#).

185



Corosolic Acid

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a corosolic acid supplement, usually available in capsule form, at a dose of 10-20 mg daily, ideally with a meal to enhance absorption. This should be continued for at least 2 to 4 weeks to assess its effects on blood sugar levels.

TYPICAL STARTING DOSE

10 mg

Description

Corosolic acid is a natural compound found in certain plants, including banaba leaves. It's studied for its potential to support blood sugar control and overall metabolic health.

How it helps

Corosolic acid (10 mg/day) reduced post-meal blood glucose in a placebo-controlled trial of 31 healthy volunteers [\[R\]](#).

Corosolic acid may help by improving insulin sensitivity.

186



Ashwagandha

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take 250-600 mg of ashwagandha supplement daily. It can be consumed with water or a meal, depending on your preference or as advised by a healthcare provider.

TYPICAL STARTING DOSE
120 mg

Description

[Ashwagandha](#) (*Withania somnifera*) is an herb used in traditional Indian medicine. This herb is known as an *adaptogen* because it helps people adapt to stress.

This herb is known as an *adaptogen* because it helps people adapt to stress [\[R\]](#), [\[R\]](#).

How it helps

In an uncontrolled trial of 6 people with mild type 2 diabetes, supplementation with 3 g/day ashwagandha for 30 days decreased blood sugar levels about as effectively as diabetes medication without significant adverse side effects [\[R\]](#).

Ashwagandha (1.2 g/day) also lowered fasting blood glucose in a 30-day placebo-controlled trial of 27 people with schizophrenia [\[R\]](#).

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Saffron

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 20 mg of saffron supplement daily. This can be taken at any time of the day, with or without food.

TYPICAL STARTING DOSE

20 mg

Description

Saffron is a spice derived from the stigma of the saffron crocus flower, and is native to the Mediterranean and Asia. Its main compounds include crocin, picrocrocin, and safranal, which may contribute to its antioxidant properties and potential mood-enhancing effects.

[Saffron](#) is a yellow spice praised for its color, taste, and potential health benefits [\[R\]](#).

Saffron is rich in antioxidants such as *crocin*. Researchers are looking into its potential benefits for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Gut conditions
- Heart health
- Mental health

How it helps

In a meta-analysis of 19 trials, saffron supplementation reduced fasting glucose (by 9.06 mg/dl) and HbA1c (by 0.19%) [\[R\]](#).

A meta-analysis of 25 trials found that saffron reduced fasting glucose and metabolic syndrome rates, but not HbA1c levels [\[R\]](#).

Another meta-analysis (9 trials and 595 participants) found significant reductions in fasting glucose (by 6.54 mg/dL) and waist circumference following saffron intervention [\[R\]](#).

However, some studies didn’t find improvements in fasting glucose with saffron supplementation [\[R\]](#), [\[R\]](#).

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Tribulus

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 250-1500 mg of Tribulus terrestris extract daily, divided into one to three doses, with meals. Start with the lower dose to assess tolerance and gradually increase as needed. This regimen can be followed for up to 90 days, after which a break or reassessment is recommended.

TYPICAL STARTING DOSE

250 mg

Description

Tribulus is an herb commonly used in traditional medicine for its potential to enhance athletic performance and libido. It is believed to contain active compounds like protodioscin, which may contribute to its aphrodisiac and adaptogenic effects.

[Tribulus](#) (*Tribulus terrestris*) grows in parts of Europe, Asia, and Africa. It’s been used in traditional Chinese and Indian medicine for centuries [\[R, R\]](#).

Today, people use tribulus to potentially help with [\[R, R\]](#):

- High blood pressure
- Sexual dysfunction and infertility

How it helps

In a placebo-controlled trial of 98 women with type 2 diabetes, taking 1 g/day of tribulus for 3 months reduced fasting blood sugar and HbA1c levels [\[R\]](#).

189



Olive Leaf Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 500-1000 mg of olive leaf extract daily, ideally in divided doses with meals. This regimen should be followed for at least 8 weeks to assess its effects on your health.

TYPICAL STARTING DOSE

500 mg

Description

Olive leaf extract is derived from the leaves of the olive tree and contains bioactive compounds such as oleuropein. It is believed to have various health benefits, including antioxidant and anti-inflammatory properties that may contribute to improved immune function and overall well-being.

How it helps

In a placebo-controlled trial of 79 participants with type 2 diabetes, supplementation with olive leaf extract (500 mg/day) for 14 weeks lowered HbA1c and fasting insulin. However, the combination of olive leaf, fenugreek, and bergamot extracts failed to improve blood sugar control in a placebo-controlled trial of 100 participants with prediabetes [R, R].

Olive leaf extract is rich in antioxidant compounds that may help with blood sugar control by reducing oxidative damage to the pancreas [R].

190



Glycine

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 3 to 5 grams of glycine supplement per day with water, preferably before bedtime for sleep improvement or spread throughout the day for general health benefits. Continue indefinitely as needed, but consult a healthcare provider for long-term use beyond three months.

TYPICAL STARTING DOSE

3 g

Description

Glycine is an amino acid that may have calming and anti-inflammatory effects, potentially benefiting sleep quality and joint health.

If you can't get enough glycine from food sources, glycine supplements are available. Daily doses of up to **6 g** have been safely used for up to **4 weeks**. Consult your doctor before supplementing.

How it helps

In a placebo-controlled trial of 12 healthy volunteers with first-degree relatives with type 2 diabetes, supplementation with glycine (5 g/day) increased early, late, and total insulin responses without changes in insulin action. Supplementation with glycine (5 g/day) for 3 months lowered HbA1c in a placebo-controlled trial of 74 patients with type 2 diabetes [\[R\]](#), [\[R\]](#).

Glycine may help by aiding in the regulation of insulin.

191



Ubiquinol

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 100 to 200 mg of ubiquinol daily, preferably with a fatty meal to enhance absorption. This dosage can be adjusted based on individual health needs and under the guidance of a healthcare professional. Continue this supplementation daily for ongoing support of heart health and energy levels.

TYPICAL STARTING DOSE

100 mg

Description

Ubiquinol is the reduced form of coenzyme Q10 (CoQ10), a compound that plays a crucial role in energy production within cells. It is used as a supplement to support heart health, improve energy levels, and combat oxidative stress.

How it helps

In a placebo-controlled trial of 50 participants, supplementation with ubiquinol (100 mg/day) for 12 weeks lowered HbA1c levels [\[R\]](#).

192



Garlic Supplement

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a garlic supplement, such as a garlic extract or aged garlic supplement, in a dosage of 600-1,200 mg per day, divided into separate doses. This should be taken with meals to minimize digestive issues. Continue daily for at least 8-12 weeks to evaluate its effects on health markers like blood pressure or cholesterol.

TYPICAL STARTING DOSE

200 mg

Description

Garlic is a pungent herb known for its potential health benefits, including cardiovascular support and immune system enhancement. It contains bioactive compounds that may help reduce the risk of chronic diseases and support overall well-being.

[Garlic](#) is a delicious aromatic herb that adds flavor to your food. But did you know that garlic has been a part of traditional medicine for thousands of years? **From ancient Egypt and Rome to China, people have praised garlic for its many health benefits.** Today, we can trace many of those benefits to sulfur-rich compounds found in garlic. People take garlic to help control their blood pressure and cholesterol [\[R\]](#).

Please note: *Garlic can interact with blood thinners (like aspirin, Plavix, Coumadin). If you are on blood thinners, consult your doctor before supplementing with garlic [\[R\]](#).*

How it helps

In 2 placebo-controlled trials of 120 people with type 2 diabetes, supplementation with garlic tablets (300 mg, 2x-3x/day) for 4-24 weeks lowered fasting glucose and enhanced the effects of the antidiabetic drug metformin [\[R\]](#).

Please note: *Garlic can interact with blood thinners (such as aspirin, Plavix, and Coumadin). In addition, garlic can irritate the stomach in some people. Talk to your doctor before taking garlic [\[R, R\]](#).*

 PERSONALIZED TO YOUR GENES

The [TNF](#) gene helps make [TNF-alpha](#), a key inflammatory protein. Increased blood levels of TNF-alpha are closely linked to [insulin resistance](#) and may even directly increase blood sugar [\[R, R, R\]](#).

Your genotype for [rs2857605](#) has been associated with increased [blood sugar](#). It may increase TNF-alpha production, leading to insulin resistance [\[R, R\]](#).

People who consume significant amounts of [garlic](#) tend to have lower TNF-alpha levels. In a meta-analysis of 7 clinical trials, including garlic in the diet reduced blood sugar [\[R, R\]](#).

>>> To learn more about the link between the TNF gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
TNF	rs2857605	TC	

193



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

In a placebo-controlled trial of 30 patients with type 2 diabetes, drinking hydrogen-rich water (900 mL/day) for 8 weeks normalized the oral glucose tolerance test in 4 out of 6 with impaired glucose tolerance and lowered LDL cholesterol (by 15.5%), small dense LDL (by 5.7%), and 8-isoprostanes (by 6.6%) [R].

Hydrogen-rich water may help by improving insulin resistance. It does this by reducing oxidative stress in the body, which plays a significant role in the development of high blood sugar levels.

194



Jackfruit

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate ripe jackfruit into your diet by adding it to smoothies, salads, or eating it raw as a snack. Aim to consume it 2-3 times a week. For those who prefer, young (unripe) jackfruit can be cooked and used as a meat substitute in dishes like tacos or curry, 1-2 times a week.

Description

Jackfruit is a tropical fruit rich in vitamins, minerals, and dietary fiber. It can be a nutritious addition to a balanced diet, supporting digestion, immunity, and overall health.

How it helps

In a placebo-controlled trial of 40 patients with type 2 diabetes, consuming green jackfruit flower (30 g/day) for 12 weeks decreased fasting glucose, postprandial glucose, and mean blood glucose [R].

Jackfruit is high in fiber and has a low glycemic index, which can slow the rate at which your body absorbs sugars.

195



Nicotinamide Mononucleotide (NMN)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 250-500 mg of nicotinamide mononucleotide (NMN) orally once daily in the morning. It can be taken with or without food. Continue this regimen as part of your daily supplement routine to support cellular health and energy levels.

TYPICAL STARTING DOSE

250 mg

Description

Nicotinamide mononucleotide is a compound that is believed to support cellular energy production and may have potential benefits for aging-related processes.

How it helps

In a small uncontrolled trial, a single dose of NMN reduced blood glucose levels in healthy men. However, NMN supplementation improved muscle insulin sensitivity and signaling in a placebo-controlled trial with overweight or obese postmenopausal women with prediabetes. Conversely, NMN did not improve HOMA-IR in a placebo-controlled trial involving middle-aged healthy adults. Additionally, NMN supplementation did not enhance walking speed or grip strength in another trial with older patients with type 2 diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

NMN may help by boosting the levels of NAD+ which is crucial for energy metabolism and maintaining proper cell function. As a result, this can enhance insulin sensitivity and promote healthier blood sugar levels.

196



Avoid Aflatoxins

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Store grains and nuts in a dry, cool place to prevent mold growth. Check for moldy smells or discoloration in foods before eating, especially in peanuts, corn, and grains. Avoid purchasing damaged or discolored grains and nuts.

Description

Aflatoxins are toxic substances produced by molds that can contaminate various food products, particularly nuts and grains. Avoiding foods contaminated with aflatoxins is crucial to prevent potential health risks, including liver damage and cancer.

How it helps

A study of 672 participants associated aflatoxin M1 exposure with inflammatory responses and oxidative stress that may lead to the onset of impaired insulin secretion and metabolism of carbohydrates, ultimately causing type 2 diabetes [\[R\]](#).

Aflatoxins can harm the liver, which plays a crucial role in maintaining blood sugar levels.

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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 12 men with type 2 diabetes, receiving hyperbaric oxygen therapy for 2 hours decreased fasting blood glucose by 19% and increased insulin sensitivity by about one-third. The combination of hyperbaric oxygen therapy and autologous bone marrow stem cell transplantation (10 sessions over 180 days) decreased HbA1c, fasting glucose, and insulin requirements in a non-placebo-controlled trial of 23 patients with type 2 diabetes [R, 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].

198



Holy Basil (Tulsi)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 300-600 mg of a holy basil extract daily, divided into two doses, with meals. Continue this supplementation for at least one month to observe benefits.

TYPICAL STARTING DOSE

300 mg

Description

Holy basil, also known as Tulsi, is an adaptogenic herb traditionally used in Ayurvedic medicine for its potential to reduce stress, boost immunity, and support overall well-being. It contains compounds believed to have anti-inflammatory and antioxidant properties.

How it helps

In a placebo-controlled trial of people with type 2 diabetes, holy basil lowered fasting blood sugar levels by 17.6% and post-meal blood sugar levels by 7.3% [R].

In a non-placebo-controlled trial of 40 people, powdered holy basil leaves (2 capsules/day for 3 months), in combination with glibenclamide, reduced fasting blood glucose by 15.6%, postprandial blood glucose by 13.4%, and HbA1c levels by 18.2% compared to glibenclamide alone [R].

199



Diaphragmatic Breathing

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Practice diaphragmatic breathing for 10-15 minutes per day. Sit or lie down in a comfortable position, place one hand on your chest and the other on your belly. Breathe in slowly through your nose, ensuring your belly moves out more than your chest. Exhale slowly through your mouth or nose, consciously relaxing the belly. Repeat this process, focusing on the movement of your belly rather than your chest.

TYPICAL STARTING DOSE

10 minutes

Description

Diaphragmatic breathing, also known as deep breathing, can help reduce stress and anxiety by activating the body's relaxation response. It promotes better oxygen exchange, reduces muscle tension, and supports overall mental and physical well-being.

How it helps

In a non-placebo-controlled trial of 100 patients with type 2 diabetes, receiving training and home practice of diaphragmatic breathing and systematic relaxation for 6 months as an add-on to antiglycemic treatment decreased HbA1c and stress. In a non-placebo-controlled trial of 60 pregnant women with gestational diabetes, practicing diaphragmatic breathing exercises 5 min/day for 30 days decreased fasting blood glucose and respiratory rate. A stress management program with diaphragmatic breathing (10 min) and progressive muscle relaxation (15 min) decreased HbA1c and perceived stress in a non-placebo-controlled trial of 53 patients with type 2 diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#).

200



Wakame

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take wakame as a dried supplement, rehydrating it in water for about 20 minutes before consuming. Aim for a daily intake of 3 to 5 grams. It can also be powdered and added to smoothies or soups.

TYPICAL STARTING DOSE
3 g

Description

Wakame is an edible seaweed commonly used in Asian cuisine. It is a source of essential nutrients like vitamins, minerals, and dietary fiber, and is known for its potential to support thyroid health, regulate blood pressure, and promote overall nutritional wellness. It contains various vitamins and minerals, including iodine, which is essential for thyroid function.

How it helps

In two separate trials, the consumption of wakame showed promising effects on glycemic response. In a placebo-controlled trial with 20 healthy participants, a meal containing 30 g starch and 5 g wakame reduced postprandial glycemic response and appetite. In a non-placebo-controlled trial involving 26 healthy volunteers, consuming 200 g of rice with 4 g dried wakame led to lower blood glucose and insulin levels 30 minutes after the meal compared to consuming rice alone [\[R\]](#), [\[R\]](#).

Wakame, a type of seaweed, contains a compound called fucoxanthin that enhances insulin sensitivity, which could help ensure that glucose is used for energy rather than remaining in the blood. In addition, wakame is a source of fiber that slows down digestion, thus preventing blood sugar spikes.

201



Goji LBP (Lycium Barbarum Polysaccharides)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 120 mg of Goji LBP (Lycium barbarum polysaccharides) supplement daily with water. It is best taken in the morning with breakfast for optimal absorption and to minimize any potential digestive discomfort. Continue this daily intake for at least 3 months to observe beneficial effects.

TYPICAL STARTING DOSE
120 mg

Description

Goji LBP, derived from goji berries, is believed to have potential health benefits, including immune system support and antioxidant effects. It's often used in traditional medicine and dietary supplements.

How it helps

In a non-placebo-controlled trial of 67 people with type 2 diabetes, taking goji fruit LBP (300 mg/day) for 3 months reduced blood glucose spikes after meals and insulin resistance [\[R\]](#).

202



Celery Leaf Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 75-150mg/day celery leaf extract standardized to a minimum 42.5% total phthalides.

TYPICAL STARTING DOSE
500 mg

Description

Celery leaf extract is a concentrated substance derived from the leaves of the celery plant (*Apium graveolens*). It is often used for its potential health benefits, which may include anti-inflammatory and antioxidant properties. Celery leaf extract is typically consumed in the form of dietary supplements or used as an ingredient in health and wellness products. It is believed to offer various benefits, such as supporting cardiovascular health, reducing blood pressure, and aiding in digestion, although more research is needed to fully establish these effects.

How it helps

A randomized clinical trial in 16 elderly pre-diabetics found that celery leaf extract capsules (250 mg, 3x/day (morning, afternoon, and evening), 30 minutes before a meal, for 12 days) decreased pre-prandial plasma glucose levels and post-prandial plasma glucose levels but did not increase plasma insulin levels [R].

Celery is noted for its low sugar content and high fiber, which can slow the absorption of sugar into your bloodstream and prevent spikes in blood glucose. Its anti-inflammatory properties also aid in improving heart health, which can be compromised in individuals with high blood sugar.

203



Okra

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take okra supplements in the form of capsules or powder. If using capsules, consume 1-2 capsules daily with water, preferably with a meal. If using powder, mix one teaspoon into a glass of water or into a smoothie once daily. Continue this routine for at least 8-10 weeks to observe potential health benefits.

Description

Okra is a flowering plant of the mallow family, rich in vitamins, minerals, and fiber, offering potential benefits for digestive health, blood sugar control, and overall nutrition.

How it helps

In 2 placebo-controlled trials involving type 2 diabetes patients, supplementation with okra (in capsule or powder form) for 8 weeks led to improved glycemic control, including lower fasting blood sugar and HbA1c levels, and better lipid profiles [R, R].

Okra is rich in fiber, which slows down the digestion of carbs. This may help keep blood sugar levels stable. Additionally, okra contains a substance called myricetin that is believed to increase insulin sensitivity.

204



Collagen Peptides

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 10-20 grams of collagen peptides daily, mixing the powder into a glass of water, juice, or a smoothie. It is recommended to consume this supplement on an empty stomach to improve absorption, ideally first thing in the morning or right before bedtime for a period of at least 8-12 weeks to observe beneficial effects.

TYPICAL STARTING DOSE

10 g

Description

Collagen peptides are a form of collagen that is broken down into smaller, more easily absorbed molecules. They are commonly used in supplements and skincare products for their potential to promote skin elasticity, hair strength, and nail health.

[Collagen](#) is a protein that helps build skin, bones, and joints [\[R\]](#), [\[R\]](#).

People use collagen supplements for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Joint pain
- Skin health
- Hair growth

How it helps

In a non-placebo-controlled trial of 100 people with type 2 diabetes, taking collagen peptides(13 g/day) for 3 months had lower blood sugar, blood pressure, cholesterol, and creatinine levels [\[R\]](#).

205



Blackcurrants

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate about 1/2 cup of fresh or frozen blackcurrants into your daily diet. You can add them to your morning yogurt, oatmeal, or smoothies. For those who prefer, blackcurrant juice or preserves can also be consumed, but be mindful of added sugars in processed forms.

Description

Blackcurrants are small, nutrient-dense berries packed with vitamins, minerals, and antioxidants. They are known for their potential to promote heart health, improve cognitive function, and provide essential nutrients for overall vitality.

How it helps

20 healthy women participated in a randomized, controlled, crossover meal study. They consumed whole blackcurrants or lingonberries (**150 g served as purées**) or blackcurrant or lingonberry **nectars (300 mL)**, each with 35 g added sucrose. Blackcurrants and lingonberries, as either whole berries or nectars, optimize the postprandial metabolic responses to sucrose. The responses are consistent with delayed digestion of sucrose and consequent slower absorption of glucose [\[R\]](#).

A study of 26 subjects investigated whether blackcurrant (75 g in a portion) independently and in a product with fermented quinoa induced similar effects on the sugar-induced postprandial glucose metabolism. In conclusion, we showed that 75 g of blackcurrant and the product with fermented quinoa were able to lower postprandial glycemia and insulinemia [\[R\]](#).

Blackcurrants are rich in anthocyanins, a type of antioxidant that improves insulin sensitivity and reduces elevated blood sugar levels. They can help manage high blood sugar by helping your body use insulin more efficiently.

206



Avoid Mycotoxin

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

To avoid mycotoxins, store grains and nuts in a dry, cool place, check for mold on foods before eating, and avoid consuming products with visible mold. Prefer buying whole foods over processed ones, and if possible, opt for foods tested for mycotoxin contamination. Discard any food that smells musty or shows signs of spoilage.

Description

Avoiding mycotoxin exposure, which can occur in contaminated foods, is crucial to prevent potential health risks such as liver damage and cancer. Being cautious about food quality and storage conditions can help minimize the risk of mycotoxin ingestion.

How it helps

A study of 672 participants associated aflatoxin M1 exposure with inflammatory responses and oxidative stress that may lead to the onset of impaired insulin secretion and metabolism of carbohydrates, ultimately causing type 2 diabetes [\[R\]](#).

Mycotoxins can worsen high blood sugar by causing inflammation in the body, which may impair insulin signaling.

207

Bifidobacterium Animalis Subsp. Lactis

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take a supplement containing Bifidobacterium animalis subsp. lactis at a dose of 10 billion colony-forming units (CFU) daily, with or without food. Joe's preferred strain is *B lactis* HN019 (10B CFU). Continue this regimen daily for at least 2 weeks to 4 weeks to observe potential benefits.

TYPICAL STARTING DOSE

10 billion CFU

Description

Bifidobacterium animalis lactis is a specific strain of probiotic bacteria known for its potential to support digestive health and immune function.

[Bifidobacterium animalis](#) is a [probiotic](#) bacterium that can be found in the healthy gut of most mammals, including humans. *B. lactis* was previously considered to be a separate species but was shown to be a subspecies of *B. animalis* [\[R\]](#), [\[R\]](#).

People mainly take *B. animalis* to support gut health [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

In an RCT with 156 patients newly diagnosed with type 2 diabetes or prediabetes, the MET-PRO group (metformin plus BB-12 probiotic) showed higher treatment compliance, greater reduction in HbA1c levels, and fewer gastrointestinal intolerance symptoms compared to the MET group (metformin alone) [\[R\]](#).

PERSONALIZED TO YOUR GENES

[HLA-C](#) and other *HLA* genes help make immune proteins involved in various autoimmune conditions, including type 1 diabetes. According to limited research, HLA-associated inflammation may impair [blood sugar](#) control [\[R\]](#), [\[R\]](#), [\[R\]](#).

Your genotype for [rs2844623](#) ('CC'; *homozygous major*) has been correlated with higher blood sugar levels — possibly due to increased HLA activity [\[R\]](#).

[Probiotics](#) may improve different inflammatory conditions, partly due to their ability to inhibit HLA proteins [\[R\]](#), [\[R\]](#), [\[R\]](#).

>>> To learn more about the link between the HLA genes and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
HLA-C	rs2844623	CC	

208



Blackcurrant Juice

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Drink 200-250 ml of blackcurrant juice daily, ideally in the morning or with a meal to optimize nutrient absorption. Continue this practice daily for at least 4-6 weeks to observe potential health benefits.

Description

Blackcurrant juice is a flavorful beverage rich in vitamin C and antioxidants, which can help support the immune system and protect cells from oxidative stress.

How it helps

A trial was conducted with 20 men and 5 postmenopausal women. They consumed a placebo drink (CON), 1200 mg apple polyphenols (AE), or 600 mg apple polyphenols + 600 mg blackcurrant anthocyanins (AE+BE) with a meal. AE+BE significantly reduced postprandial glucose concentrations at 0-30 and 0-120 min compared to CON. AE also reduced glucose at 0-30 min but not significantly at 0-120 min. Insulin, C-peptide, and GIP concentrations were reduced with polyphenol-rich drinks [R].

20 healthy women participated in a randomized, controlled, crossover meal study. They consumed whole blackcurrants or lingonberries (**150 g served as purées**) or blackcurrant or lingonberry **nectars (300 mL)**, each with 35 g added sucrose. Blackcurrants and lingonberries, as either whole berries or nectars, optimize the postprandial metabolic responses to sucrose. The responses are consistent with delayed digestion of sucrose and consequent slower absorption of glucose [R].

Blackcurrant juice contains anthocyanins, types of flavonoids that can improve insulin resistance, making it easier for your body to use insulin and lower your blood sugar levels. However, it's important to consume it in moderation due to the natural sugars present in the juice.

209



Onion

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate raw or cooked onions into your daily meals, aiming for about a half to one whole onion per day, depending on your taste preference and tolerance. This can be done by adding onions to salads, sandwiches, soups, or as a cooked ingredient in various dishes.

Description

Onions are a flavorful and versatile vegetable grown around the world. They are rich in antioxidants, vitamins, and minerals, like B-vitamins, vitamin C, phosphorus, and magnesium. Incorporating onions into your diet may promote heart health, improve immune function, and contribute to overall well-being.

How it helps

A comparative study, using a crossover design, with 20-well controlled diabetic patients found that following a special diet with 60 g fresh onion/day decreased blood sugar level (4.37 mg%), without affecting blood lipid levels [R].

In a study with overweight or obese women with polycystic ovary syndrome, high onion intake (2x40-50g/day for overweight and 2x50-60g/day for obese) reduced total and LDL cholesterol, while not affecting other parameters [R].

210



Black Chokeberry

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate black chokeberry (*Aronia melanocarpa*) in your diet by consuming 100-200 grams of fresh berries daily. If using a concentrated form like juice or extracts, follow the manufacturer's instructions, usually around 100 ml of juice or 500 mg of extract per day, for at least 8-10 weeks to observe potential health benefits.

Description

Black chokeberry is a fruit known for its high content of antioxidants and potential health benefits. It may support cardiovascular health and provide immune system support when incorporated into a balanced diet.

How it helps

In a non-placebo-controlled trial of 41 patients with type 1 diabetes, consuming black chokeberry juice (200 mL/day) for 3 months lowered fasting glucose (by 4.18 mmol/L), HbA1c, and TC (by 1.4 mmol/L) [\[R\]](#).

In a placebo-controlled trial of 143 patients with metabolic syndrome, supplementation with black chokeberry extract for 4 weeks decreased LDL cholesterol [\[R\]](#).

211



Chicory

IMPACT

1 / 5

EVIDENCE

1 / 5

Description

Chicory is a nutrient-rich vegetable that has been shown to have a number of health benefits. It is a good source of fiber, vitamin K, and antioxidants. Chicory may also help to improve digestion, lower blood sugar levels, and boost the immune system.

How it helps

In a placebo-controlled trial of 47 healthy adults, drinking 300 mL/day of chicory root extract for 4 weeks lowered HbA1c levels. Another trial of 46 patients with type 2 diabetes mellitus showed that enriched chicory inulin supplementation reduced fasting serum glucose and HbA1C. Additionally, a larger trial with 150 patients with type 2 diabetes reported that 12 weeks of chicory seeds supplementation effectively lowered HbA1c [\[R\]](#), [\[R\]](#), [\[R\]](#).

212



Blueberries

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate a half to one cup of fresh or frozen blueberries into your daily diet. You can add them to your breakfast cereal, smoothies, or enjoy them as a snack on their own.

Description

Blueberries are a nutritious fruit packed with antioxidants, vitamins, and fiber. They are known for their potential to support brain health, reduce the risk of chronic diseases, and promote overall well-being.

[Blueberries](#) are enjoyed all around the world for their sweet taste and nutritional benefits. They may support [\[R\]](#):

- Heart health
- Cognitive function
- Normal blood sugar levels

How it helps

A high intake of blueberries reduces the risk of type 2 diabetes by ~33% according to a meta-analysis of 23 studies [\[R\]](#).

A meta-analysis of 22 studies found the consumption of blueberries reduces fasting glucose (17.72 mg/dL) and HbA1c (by 0.32%) but not insulin resistance in people with diabetes [\[R\]](#).

However, 2 meta-analyses (the largest one with 21 studies) found no significant effects of blueberries on glycemic status markers or anthropometric measurements in people without diabetes [\[R\]](#), [\[R\]](#).



PERSONALIZED TO YOUR GENES

The [LEP](#) gene helps make [leptin](#), a key hormone in appetite and metabolism control. Leptin improves insulin sensitivity and helps reduce blood sugar levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Your genotype for [rs791595](#) may contribute to [leptin resistance](#). It's been associated with increased [blood sugar](#) levels [\[R\]](#), [\[R\]](#).

The consumption of polyphenol-rich fruits, such as [blueberries](#) and [bilberries](#), may improve leptin resistance [\[R\]](#), [\[R\]](#), [\[R\]](#).

>>> To learn more about the link between the LEP gene and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
IMPDH1	rs791595	AG	

213



Dragon Fruit

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate dragon fruit into your diet by eating it raw or adding it to salads, smoothies, or yogurt. Aim for consuming dragon fruit 2-3 times a week to enjoy its benefits. Simply slice it in half and scoop out the flesh to eat.

Description

Dragon fruit is a colorful tropical fruit rich in antioxidants, vitamins, and fiber. Consuming dragon fruit as part of a balanced diet can support overall nutritional wellness and may offer benefits such as improved digestion and skin health.

How it helps

A meta-analysis of 4 trials and 36 participants concluded that eating dragon fruit reduces fasting glucose in prediabetic subjects (by 15.1 mg/dL) but not in type 2 diabetic patients [\[R\]](#).

Dragon fruit has a low glycemic index, which means it will not spike your blood sugar levels quickly after consumption. It also contains dietary fiber that slows down the absorption of sugar, helping to maintain stable blood sugar levels.

214



Guava

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate fresh guava into your diet by consuming 1-2 whole fruits daily or adding sliced guava to salads, smoothies, or yogurts. This can be continued as a regular part of your daily dietary intake to obtain its nutritional benefits.

Description

Guava is a nutritious fruit rich in vitamins, minerals, and dietary fiber. Consuming guava can support immune health, digestive regularity, and overall well-being.

Guava (*Psidium guajava* L.) is a tropical fruit found from India to Indonesia, and the Caribbean to Latin America. The fruit and leaves of the guava plant have been used medicinally for centuries.

People use guava fruit and leaf extracts to potentially help with [R](#), [R](#):

- Diabetes
- Digestive issues
- Weight control
- Joint health

How it helps

In a non-placebo-controlled trial of 19 healthy volunteers, guava (both bites and puree) was found to elicit low postprandial glycemic responses. In a non-placebo-controlled trial of 31 healthy volunteers, performing an oral glucose tolerance test in which the glucose solution contained guava extract inhibited intestinal glucose resorption, possibly in combination with reduced insulin secretion [R](#), [R](#).

Guava is high in dietary fiber, which slows down the absorption of sugar into the bloodstream. It also contains a low glycemic index, which is beneficial for diabetes control.

215



Fasting Mimicking Diet

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Adopt a fasting mimicking diet for 5 consecutive days per month, consuming between 750 and 1,100 calories per day consisting mostly of plant-based soups, vegetables, nuts, seeds, and herbal teas. Ensure adequate hydration. Resume a normal, healthy diet for the remaining days of the month.

Description

The fasting mimicking diet is a dietary approach that involves cycles of fasting and calorie restriction to potentially promote longevity and metabolic health. It is currently an area of research interest for its possible health benefits.

How it helps

In a non-placebo-controlled trial of 40 patients with type 2 diabetes, following a fasting-mimicking diet for 6 months reduced insulin resistance, the albumin-to-creatinine ratio (only in patients with microalbuminuria), and soluble urokinase plasminogen activator receptor. In a non-placebo-controlled trial of 100 patients with type 2 diabetes, following a fasting-mimicking diet for 4 months lowered fasting glucose, 2-hour postprandial glucose, and HbA1c [\[R\]](#), [\[R\]](#).

216



Butyrate

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take butyrate supplements orally with a full glass of water, typically starting with a dose of 300 to 600 mg per day. It can be taken with or without food, but if stomach upset occurs, try taking it with meals. The specific dosage and duration of use should be based on the guidance of a healthcare professional, tailored to individual health needs.

TYPICAL STARTING DOSE

300 mg

Description

Butyrate is a short-chain fatty acid produced by gut bacteria during the digestion of dietary fiber. It plays a crucial role in maintaining gut health, supporting the integrity of the intestinal lining, and contributing to overall digestive well-being.

[Butyrate](#) is a short-chain fatty acid produced when the gut bacteria ferment indigestible fibers. It prevents inflammation in the gut and is essential for maintaining a healthy barrier between the large bowel and the bloodstream [\[R\]](#).

People take butyrate to support gut health, improve insulin sensitivity, and promote weight loss.

How it helps

Butyrate can support blood sugar control by improving insulin sensitivity, the hormone that regulates blood sugar. Additionally, it can optimize gut health, which indirectly impacts sugar metabolism.

In a placebo-controlled trial of 42 patients with type 2 diabetes, supplementation with sodium butyrate for 6 weeks reduced systolic and diastolic blood pressure and blood sugar 2-hr postprandial [\[R\]](#).

In a placebo-controlled trial of 60 patients with type 2 diabetes, supplementation with sodium butyrate alone (sx 100-mg capsules before an after each of the 3 daily meals for 45 days) reduced diastolic blood pressure and increased glucagon-like peptide 1 concentration, while its combination with inulin also reduced fasting blood sugar, waist circumference, and waist-to-hip ratio [\[R\]](#).

217



Bacillus Clausii

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take Bacillus clausii as an oral probiotic supplement, usually found in liquid or capsule form. For adults and children, the typical dosage is one or two capsules (or one or two vials of liquid, if using that form) daily. The duration of use can vary; some may take it for a few weeks during or after antibiotic treatment, while others might use it for longer periods to support digestive health.

Description

Bacillus causii is a type of beneficial bacteria that can be found in probiotic supplements, potentially contributing to digestive health and a balanced gut microbiome.

How it helps

In a placebo-controlled trial of 20 patients with type 2 diabetes, supplementation with *B. clausii* for 90 days lowered blood glucose, raised HDL-C, and improved intestinal microbiota profiles [\[R\]](#).

218



Brown Seaweed

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a supplement containing brown seaweed extract, such as Fucus vesiculosus or Ascophyllum nodosum, in capsule or powder form. Aim for a daily dosage of 500-1000 mg, preferably with meals to enhance absorption. Continue this regimen for at least 8-12 weeks to evaluate its effects on your health.

TYPICAL STARTING DOSE

500 mg

Description

Brown seaweed, such as kelp and wakame, is a nutrient-dense marine alga often used in Asian cuisine and dietary supplements. It's a natural source of essential minerals like iodine and may offer various health benefits, including thyroid support and potential antioxidant effects.

How it helps

In a placebo-controlled trial of 80 prediabetic participants, supplementation with brown seaweed (Ecklonia cava) extract (1500 mg/day) for 12 weeks decreased postprandial glucose [\[R\]](#).

In a placebo-controlled trial of 65 dysglycemic patients, supplementation with polyphenols from two brown seaweed species (*Ascophyllum nodosum* and *Fucus vesiculosus*) for 6 months reduced insulin resistance, fasting glucose, postprandial glucose, and HbA1c [\[R\]](#).

However, supplementation with 500-2000 mg phlorotannin-rich brown seaweed (Fucus vesiculosus) extract 30 min before eating 50 g of available carbohydrate from white bread had no effect on postprandial glucose in a placebo-controlled trial of 38 healthy volunteers [\[R\]](#).

219



Blackcurrant Supplement

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a blackcurrant supplement containing 300mg of blackcurrant extract daily, preferably with a meal to enhance absorption. Continue this regimen for at least 8 weeks to observe potential benefits.

Description

Blackcurrant supplements are often used to harness the health benefits of blackcurrants in a convenient form. They can provide a concentrated source of antioxidants and nutrients that support various aspects of well-being.

Black currant oil contains between 150-200mg of GLA per gram.

How it helps

Blackcurrant supplements are high in anthocyanins, which have been shown to improve insulin sensitivity and reduce blood sugar levels. They can therefore help manage high blood sugar levels in diabetic patients.

In a randomized, double-blind, crossover trial with men and postmenopausal women, blackcurrant extract significantly reduced early plasma glucose and insulin response to a high-carbohydrate meal compared to placebo [\[R\]](#).

220



Baicalin

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take baicalin supplements in doses ranging from 50 to 500 mg per day. Choose a high-quality supplement and consult with a healthcare provider before beginning, especially if taking other medications or if pregnant or breastfeeding. Baicalin should be taken with a glass of water, preferably with a meal to aid absorption, and can be divided into 1-2 doses throughout the day. Continuous use should be reassessed every 3-6 months with healthcare guidance.

TYPICAL STARTING DOSE

50 mg

Description

Baicalin is a natural compound found in certain plants like the Chinese skullcap. It has several health benefits like reducing inflammation, battling bacteria, and protecting the brain. Research also suggests it could be useful in treatments for heart and liver conditions.

How it helps

In a placebo-controlled trial of 12 patients with type 2 diabetes taking metformin, supplementation with baicalin (3.52 g/day) for 8 weeks improved glucose tolerance and reduced TNF-alpha levels [\[R\]](#).

Baicalin may help by increasing insulin production and enhancing its usage in the body. Plus, it can also lessen glucose absorption from the diet.

221



Boswellia

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a 350 mg Boswellia supplement daily, ideally with a meal to enhance absorption.

TYPICAL STARTING DOSE

350 mg

Description

Boswellia is an herbal remedy derived from the resin of certain trees. It's known for its potential anti-inflammatory properties and is often used to support joint health.

[Boswellia](#), also known as frankincense, is the hardened sap of the *Boswellia serrata* tree [\[R\]](#).

In traditional medicine, boswellia is used for joint pain and gut conditions [\[R\]](#).

Today, some people use boswellia for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Osteoarthritis
- IBD
- Skin aging
- Asthma
- Gum health

How it helps

Boswellia gum resin (800-900 mg/day) significantly decreased blood glucose, and glycated hemoglobin after 6-12 weeks in 2 placebo-controlled trials of 131 people with type 2 diabetes [\[R\]](#), [\[R\]](#).

The combination of boswellia gum resin, milk thistle, and stinging nettle (1 capsule containing 200 mg of each extract, 3x/day) lowered fasting blood glucose and glycated hemoglobin in a 3-month placebo-controlled trial of 60 people with type 2 diabetes [\[R\]](#).

222



Yerba Mate

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take yerba mate as a supplement by consuming 1 to 3 grams of the dried leaves in capsule form daily, or by drinking 1 to 3 cups of yerba mate tea. Do this consistently for at least 4 to 8 weeks to observe potential benefits.

TYPICAL STARTING DOSE

1 g

Description

Yerba mate is a South American herbal tea known for its caffeine content and antioxidant properties. It provides a boost in alertness and mental clarity and is used for its potential to enhance focus and energy.

Yerba mate is a traditional South American beverage made from the dried leaves of the yerba mate plant (*Ilex paraguariensis*). It is commonly consumed in countries like Argentina, Uruguay, Paraguay, and Brazil, and has a long history of cultural significance and social bonding.

Yerba mate is traditionally sipped through a *bombilla*, a special metal straw, from a gourd-shaped container. This results in a flavorful and stimulating drink often shared among friends and family.

How it helps

In a non-placebo-controlled trial of 29 people with type 2 diabetes and 29 with prediabetes, drinking yerba mate (*Ilex paraguariensis*) tea (330 mL, 3x/day) decreased fasting glucose, glycated hemoglobin, and LDL cholesterol levels (but not food intake) in people with type 2 diabetes. In prediabetic patients, the tea improved cholesterol and triglyceride levels and reduced their consumption of fat and cholesterol while increasing their fiber intake [R].

In a 3-month placebo-controlled trial of 137 people with prediabetes, a nutraceutical compound with yerba mate (500 mg/day), white mulberry, and chromium picolinate reduced fasting glucose (by 7.8%) and insulin resistance (by 7.9%). Moreover, 16.6% of the patients returned to normal glycemia and 67% to normal insulin sensitivity [R].

Yerba mate may have additional effects by lowering insulin resistance and reducing the formation of advanced glycation end-products. These compounds are formed from high blood sugar and contribute to diabetes complications like poor blood flow, bad vision, kidney damage, and inflammation. To obtain this last benefit, it's best to not add sugar to the mate tea [R, R, R].

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Lactobacillus Casei

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a supplement containing Lactobacillus casei daily, with a dosage recommended by the product's manufacturer or a healthcare professional. The specific amount can vary, but it is commonly found in doses around 10 billion colony-forming units (CFUs). Continue this regimen for at least 4 weeks to observe potential health benefits.

TYPICAL STARTING DOSE

10 billion CFU

Description

Lactobacillus casei is a probiotic bacterium known for its potential to support gut health and immune function. It contributes to a balanced gut microbiome and may help alleviate digestive issues like diarrhea.

[Lactobacillus casei](#) is a [probiotic](#) bacterium found in fermented foods (e.g., cheese), as well as in the reproductive and gastrointestinal tracts of humans and other animals [\[R, R\]](#).

People mainly take *L. casei* to support a healthy gut microbiota [\[R\]](#).

How it helps

Consuming *L. casei* Shirota maintained normal insulin sensitivity and fasting glucose levels during a high-fat diet in a non-placebo-controlled trial. In a placebo-controlled trial with type 2 diabetes patients, *L. casei* supplementation improved fasting blood sugar, insulin levels, and insulin resistance. However, *L. casei* Shirota did not improve insulin sensitivity, β -cell function, endothelial function, or inflammation markers in another trial with metabolic syndrome patients [\[R, R, R\]](#).

L. casei can improve your gut health. Research shows a healthy gut can affect insulin resistance, an underlying cause of high blood sugar.

 PERSONALIZED TO YOUR GENES

[HLA-C](#) and other *HLA* genes help make immune proteins involved in various autoimmune conditions, including type 1 diabetes. According to limited research, HLA-associated inflammation may impair [blood sugar](#) control [\[R, R, R\]](#).

Your genotype for [rs2844623](#) ('CC'; *homozygous major*) has been correlated with higher blood sugar levels — possibly due to increased HLA activity [\[R\]](#).

[Probiotics](#) may improve different inflammatory conditions, partly due to their ability to inhibit HLA proteins [\[R, R, R\]](#).

>>> To learn more about the link between the *HLA* genes and blood sugar, check out the full SelfDecode blog post [here](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
HLA-C	rs2844623	CC	

224



Sage Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take sage extract in supplement form, ideally in doses ranging from 300 to 600 mg daily, divided into 2 or 3 doses throughout the day. It is recommended to follow this regimen for at least 1 to 2 months to evaluate its effects on cognitive function and mood improvements.

TYPICAL STARTING DOSE
300 mg

Description

Common sage (*Salvia officinalis*) is an herb from the mint family. It is native to the Mediterranean region. The main compounds in sage extract include essential oils like thujone and cineole, which contribute to its flavor and potential benefit for sore throats and digestive issues [R].

People commonly use sage as a spice and a traditional remedy for [R, R]:

- Sore throat
- Mood
- Blood sugar and cholesterol control
- Heavy sweating

How it helps

In a placebo-controlled trial of 40 hyperlipidemic subjects with type 2 diabetes, supplementation with sage extract (500 mg, 3x/day) for 3 months lowered fasting glucose (by 32.2%) and HbA1c (by 22.7%) [R].

Please note: *rosmarinic acid from sage may inhibit the production of the thyroid hormone T4 (thyroxine). Individuals with thyroid disorders, particularly hypothyroidism or low T4 levels, should exercise caution when using sage extract and always consult with a healthcare provider before taking this supplement* [R].

225



Chamomile

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take chamomile supplements in the form of capsules or tablets, usually ranging from 300 to 400 mg, up to three times daily between meals. If using chamomile tea as a supplement, drink 1 to 4 cups daily.

TYPICAL STARTING DOSE

300 mg

Description

Chamomile is an herbal remedy derived from the dried flowers of the chamomile plant. It is widely used for its calming and soothing properties

Chamomile is an herb native to Africa, Asia, and Europe. It was used as a traditional herbal remedy in ancient Greece, Rome, and Egypt. Today, chamomile is used in cosmetics, aromatherapy, tea, and supplements. It may help with [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Skin problems
- Period cramps
- Gut problems
- Sleep quality
- Mood

How it helps

In a placebo-controlled trial of 64 subjects with type 2 diabetes, drinking chamomile tea (3 g/150 mL hot water) 3x/day after meals for 8 weeks lowered HbA1c, serum insulin, insulin resistance, total cholesterol, LDL cholesterol, triglycerides, and MDA [\[R\]](#), [\[R\]](#).

Chamomile tea may help lower blood sugar levels by increasing insulin production and reducing complications associated with high blood sugar.

226



L-Citrulline

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 1.5 to 5 grams of L-citrulline supplements per day, orally, with or without food. This dosage can be taken all at once or divided into two to three smaller doses throughout the day. It's generally recommended to start at the lower end of the dosage range and adjust based on your body's response.

TYPICAL STARTING DOSE

3 g

Description

L-citrulline is an amino acid that may help improve blood flow and reduce muscle soreness, making it a popular supplement for athletes and individuals with certain cardiovascular conditions. Its potential to enhance nitric oxide production supports vascular health and overall circulation.

[Citrulline](#) is an amino acid (protein building block). Citrulline can be found in foods like [R](#), [R](#), [R](#), [R](#), [R](#):

- Watermelon
- Pumpkins
- Cucumber
- Bitter melon

The body uses L-citrulline to produce nitric oxide, a compound that helps widen blood vessels. It is important for heart and sexual health [R](#), [R](#), [R](#).

L-citrulline is commonly used as supplement to support [R](#):

- Blood vessel health
- Muscle health
- Metabolic health
- Sexual health

How it helps

In a placebo-controlled trial of 54 patients with type 2 diabetes, supplementation with citrulline (3 g/day) for 8 weeks lowered serum levels of insulin, glucose, HbA1c, and HOMA-IR [R](#).

227



Brazil Nuts

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Consume 1-2 Brazil nuts daily to meet your selenium needs and potentially improve heart health and thyroid function. Do not exceed this amount to avoid selenium toxicity.

Description

Brazil nuts are a nutritious snack rich in selenium, a mineral essential for various bodily functions, including thyroid health and immune support.

Brazil nuts have an enormous amount of selenium along with other minerals like magnesium, phosphorus, and copper, and vitamins E and B1. A 1-ounce (6–8 nuts) serving provides 544 mcg of selenium or 989%DV.

How it helps

Consuming Brazil nuts may lower blood glucose levels more in people with certain gene variants [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Consuming Brazil nuts may lower blood glucose levels more in people with your [SELENOP](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
SELENOP	rs3877899	TC	

228



Tea

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Drink 1-3 cups of tea daily, choosing from green, black, or herbal varieties according to preference. It's beneficial to consume tea throughout the day, either hot or cold, for ongoing hydration and health benefits.

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 polyphenols 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 many active compounds. These include antioxidants like EGCG and amino acids like [L-theanine](#). Active components of tea help support [\[R, R, R, R, R, R\]](#):

- Heart health
- Cognition
- Immunity
- Relaxation

How it helps

High green tea consumption may reduce the risk of complications in people with type 2 diabetes carrying certain gene variants [\[R\]](#).

 PERSONALIZED TO YOUR GENES

High green tea consumption may reduce the risk of complications in people with type 2 diabetes carrying your [SOD2](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
SOD2	rs4880	GG	

229



Carnivore Diet

IMPACT

0 / 5

EVIDENCE

1 / 5

How to implement

Choose high-quality meats and gradually reduce carbohydrates to help your body adapt. Keep meals simple by including a variety of meats and organ meats for essential nutrients. Stay hydrated and monitor electrolyte levels due to the lack of plant-based foods. Pay attention to how your body responds, adjusting as needed, and track your progress to stay motivated. Listening to your body and ensuring nutrient variety are key to successfully following the Carnivore diet.

Description

The carnivore diet, also called "zero carb", is exactly what it sounds like: **its adherents eat only meat**. Some people are more strict than others about what counts as meat; animal products like milk, cheese, and eggs are a topic of debate. Some people [salt](#) their food, while others claim not to need it.

Most people who eat a carnivore diet are likely to say that they eat this way to avoid the “toxins” or [antinutrients](#) in plant matter. They point to compounds like **gluten, oxalates, lectins, histamine**, and other [potentially inflammatory compounds found in plant-based foods](#), which may cause serious illness in people who are sensitive to them. **Many specialized diets, such as the [lectin avoidance diet](#), aim to eliminate specific antinutrients and potentially prevent certain inflammatory conditions** [\[R, R, R\]](#).

Critics of the carnivore diet say that it destroys the intestines and can’t provide all the nutrients the human body requires. Meanwhile, some proponents of the carnivore diet may point to people like **the Maasai and Inuit, who eat traditional diets of almost exclusively meat** [\[R, R\]](#).

How it helps

A survey of 2029 participants who consumed a carnivore diet for 14 months or more found that it reportedly lowered BMI, HbA1c, and medication use in those with diabetes [\[R\]](#).

230



Biotin

IMPACT

0 / 5

EVIDENCE

1 / 5

How to implement

For adults, take a biotin supplement of 30 to 100 micrograms daily. This can be consumed in a single dose with a meal to improve absorption. It is recommended to continue daily for optimal benefits on hair, skin, and nail health.

TYPICAL STARTING DOSE

30 mcg

Description

Biotin, also known as vitamin B7, is an essential nutrient that plays a key role in metabolizing carbohydrates, fats, and proteins. It is important for maintaining healthy hair, skin, and nails and supporting overall metabolic function.

A **biotin supplement** of up to 30 micrograms per day can be taken to meet needs not achieved through diet.

How it helps

The combination of biotin (2 mg/day) and chromium picolinate (600 mcg/day) taken for 28-90 days lowered fasting glucose (by 9.8 mg/dL), 2-hour glucose after a glucose tolerance test (by 9.7%), and HbA1c in 4 placebo-controlled trials of 874 patients with type 2 diabetes [\[R, R, R, R\]](#).

Biotin, when taken in combination with chromium, may enhance blood sugar control by improving glucose metabolism.

231



Plasmalogens

IMPACT

0 / 5

EVIDENCE

1 / 5

How to implement

Follow the dosage instructions provided on the product label or as directed by your healthcare provider. Typically, these supplements come in capsule form and are taken once daily with water, ideally with a meal to enhance absorption. Consistency is key, so taking them at the same time each day is recommended. Always consult a healthcare professional before starting plasmalogen supplements, especially if you are pregnant, nursing, or have any medical conditions.

Description

Plasmalogens are a special kind of phospholipids found in cell membranes, particularly in the brain (comprising 20% of its content), heart, lungs, eyes, and kidneys. Plasmalogens help the nervous system work and prevent brain cell death by reducing inflammation and oxidative stress. Their levels decrease with age [\[R\]](#).

Plasmalogen supplements are being researched to improve cognitive function in both healthy subjects and those with mild cognitive impairment or Alzheimer’s disease [\[R, R\]](#).

How it helps

A study of 10,339 participants found that those with the highest ethanolamine plasmalogen levels had a decreased prevalence of type 2 diabetes and cardiovascular disease, as well as reduced mortality risk [\[R\]](#).

However, whether supplementation helps reduce the risks remains unknown.

232



Avoid L-Lysine Supplements

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Do not purchase or consume L-lysine supplements. If you have been taking L-lysine, consider stopping its use immediately.

Description

Avoiding excessive L-lysine supplements is advisable, as high doses may lead to potential side effects and interactions with medications.

How it helps

L-lysine supplements can potentially increase your blood glucose levels, hence if you have high blood sugar, it's best to avoid them to prevent further elevation. In line with this, genetically higher lysine levels have been associated with an increased risk of high blood sugar [\[R\]](#).

233



Dietary Vitamin A

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Include foods high in vitamin A in your daily diet, such as sweet potatoes, carrots, spinach, and fortified foods like milk. Aim for 700-900 micrograms (mcg) of vitamin A per day for adults, depending on your age and sex, with a slightly higher intake recommended for women who are pregnant or breastfeeding.

Description

Vitamin A is essential for maintaining healthy vision, immune function, and skin integrity. It also plays a role in cell differentiation and growth, supporting various bodily functions.

How it helps

Six studies of over 32k people associated low levels of this vitamin or its precursor beta-carotene with type 1 and type 2 diabetes, insulin resistance, and metabolic syndrome [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

In line with this, genetically higher retinol levels may be associated with a reduced risk of diabetes [\[R\]](#).

Please note: *There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.*

Please note: *A high dose of vitamin A or taking high amounts of vitamin A long-term can be harmful, especially in women planning pregnancy or already pregnant. Vitamin A may cause harm to the fetus. Vitamin A may also interact with some medications. Talk to your doctor before supplementing with vitamin A* [\[R\]](#), [\[R\]](#), [\[R\]](#).

234



Geranylgeraniol

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Geranylgeraniol can be taken as a dietary supplement, typically in the form of capsules or softgels. The recommended dosage varies depending on individual health needs and the specific product formulation. It is generally advised to start with a lower dose and gradually increase it, under the guidance of a healthcare professional. Taking it with a meal may enhance absorption and efficacy.

TYPICAL STARTING DOSE
150 mg

Description

Geranylgeraniol is a natural compound found in various plants and herbs, known for its potential health benefits. It plays a crucial role in the body's biosynthesis of essential molecules like CoQ10 and vitamin K2. This compound is noted for its anti-inflammatory, antioxidant, and anti-cancer properties, making it a promising supplement for enhancing overall well-being.

How it helps

Animal studies have demonstrated that GG can improve glucose homeostasis and insulin sensitivity. In obese mice, GG supplementation led to better glucose tolerance and reduced production of pro-inflammatory adipokines. These effects were associated with changes in the gut microbiome, indicating a potential prebiotic role for GGOH [R, R].

The combination of GGOH with green tea polyphenols may improve glucose clearance and insulin sensitivity in high-fat diet-induced obese mice [R].

235



Oxaloacetate

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 100mg of oxaloacetate supplement daily, preferably in the morning on an empty stomach to facilitate absorption. Continue this regimen consistently for at least several months to evaluate its benefits.

Description

Oxaloacetate supplements provide a stable form of the chemical that can be ingested. It is taken for its role in supporting cellular energy production, which may help boost energy levels and focus.

How it helps

The administration of OAA-sodium brought about a lowering of the blood sugar level in normal and alloxan-diabetic animals. The same drug was given to diabetic patients, and it was found effective in all 10 type 1 and 6 type 2 diabetics according to Yamakawand Kurokawa's classification [R].

Oxaloacetate supplements may help by improving insulin sensitivity. Plus, they can stimulate processes in your body that use up extra glucose.

236



Limit Copper Intake

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Do not include copper supplements in your daily vitamin or supplement routine. Check the labels of any multivitamins or dietary supplements you are currently taking to ensure they do not contain copper. Ideally, you should also check copper levels in your tap water. If they are excessive, consider using a reliable water filter or drinking spring water.

Description

Taking too many copper supplements can cause a copper overdose in your body. This can be harmful, leading to issues like stomach pain, nausea, and even heart problems. For healthy individuals, the amount of copper obtained through a balanced diet is usually enough without needing supplementation. It's vital to maintain the natural balance of minerals in the body for good health.

Contaminated tap water can also be a source of excess copper.

How it helps

Genetically higher copper levels may be associated with an increased risk of diabetes in women [\[R\]](#).

Excess copper may exacerbate high blood sugar by interfering with glucose metabolism, causing your blood sugar levels to increase.

237



Avoid Selenium Supplements

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Do not take any dietary supplements that contain selenium. Check the labels of all multivitamins or dietary supplements you are considering to ensure they do not list selenium as an ingredient.

Description

You may need to stop taking selenium supplements. You should also make sure that your total selenium intake from any other supplements does not exceed the recommended daily intake dose [\[R, R, R\]](#).

How it helps

Genetically higher selenium levels may be causally associated with an increased risk for high blood sugar [\[R, R\]](#)

Some studies found that low selenium levels may also be associated with a higher risk of diabetes. However, supplementation with selenium may not change the risk of type 2 diabetes [\[R, R, R, R, R, R, R, R\]](#).

Please note: *There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.*

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Avoid Iron Supplements (Unless Deficient)

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Only take iron supplements if a blood test shows you are iron deficient. If not deficient, do not use iron supplements. For those diagnosed with iron deficiency, follow your healthcare provider's instructions on the type and dosage of iron supplement to take.

Description

Iron (Fe) is an essential mineral. It helps make [hemoglobin](#), a protein that carries oxygen to cells. In this way, iron **increases energy** and supports **brain and immune system function** [\[R, R, R\]](#).

Avoiding unnecessary iron supplements, particularly without a confirmed deficiency, can prevent the risk of iron overload, which can lead to health issues like hemochromatosis and oxidative stress.

However, too much iron can be bad for the body. It can deposit into organs, such as the liver, heart and the pancreas. This can cause issues such as liver disease, heart problems and diabetes [\[R, R\]](#).

How it helps

Genetically higher iron levels may be associated with 7% higher odds of type 2 diabetes [\[R\]](#).

Please note: *Some people deficient in iron may need to take iron supplements. Your doctor should help you make that decision based on your actual iron levels.*

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Avoid Alanine Supplements

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Do not purchase or consume supplements that list alanine, specifically as an ingredient. This includes not using powders, pills, or any form of supplement designed for direct consumption that contains alanine.

Description

L-alanine is a non-essential amino acid that plays a crucial role in the body's energy metabolism, particularly during periods of intense exercise. It can help support endurance and muscle recovery by providing a source of energy and aiding in the removal of harmful metabolic byproducts like lactic acid.

How it helps

Genetically predicted plasma alanine is not linked to coronary artery disease but has been associated with a 35% higher risk of diabetes, elevated glucose, LDL-cholesterol, triglycerides, total cholesterol, apolipoprotein B, and blood pressure, particularly in females for LDL-cholesterol and triglycerides [\[R\]](#).

Mendelian randomization studies demonstrated that a genetic predisposition to type 2 diabetes may be associated with increased levels of alanine, as well as genetically predicted higher alanine levels increasing the risk for diabetes [\[R, R\]](#).

240



Agmatine

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take agmatine as a dietary supplement in a dose of 1.6 to 6.4 milligrams per kilogram of body weight, daily. It can be consumed with or without food. For best results, continue taking it on a daily basis for at least two weeks to assess its effect on your body.

TYPICAL STARTING DOSE

1 g

Description

Agmatine is a naturally occurring compound found in the human body and in certain foods. It is sometimes used as a dietary supplement and is believed to have potential benefits for pain relief, mood regulation, and cognitive function.

How it helps

Agmatine has demonstrated hypoglycemic effects through various mechanisms, such as insulin-like actions on end organs, stimulation of insulin release from pancreatic islet β cells, and activation of imidazoline receptors, leading to increased glucose uptake [R, R].

Agmatine may also inhibit advanced glycation end-product formation, improve nerve regeneration, enhance kidney function, and complement metformin’s effects on type 2 diabetes [R].

Agmatine improved insulin sensitivity in insulin-resistant rats by reducing mTOR and glucose transporter 2 (GLUT2) production. Agmatine also reduced blood sugar levels in rats by increasing β -endorphin production by the adrenal glands. β -endorphins cause the uptake of glucose from the blood into skeletal muscle tissue [R, R, R, R, R, R].

Please note: *There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.*

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R-Alpha-Lipoic Acid

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take R-Alpha-Lipoic Acid as directed on the supplement label or by your healthcare provider. It is recommended to take 100-300 mg daily, with meals to enhance absorption and minimize gastrointestinal discomfort. Drink plenty of water, and consult your healthcare provider before starting if you have any underlying health conditions or are taking other medications.

TYPICAL STARTING DOSE
100 mg

Description

R-alpha-lipoic acid (R-ALA) is an antioxidant supplement, a biologically active form of alpha-lipoic acid. Unlike standard alpha-lipoic acid, which may contain a mix of its R and S forms, R-ALA is the naturally occurring form, potentially offering enhanced bioavailability. Alpha-lipoic acid supports energy metabolism, combats oxidative stress, and may help manage weight and inflammation.

How it helps

R-ALA supplementation improved glucose uptake and insulin sensitivity in one animal study, suggesting its potential to improve blood sugar control and metabolic syndrome [R].

It may also reduce oxidative eye damage caused by high blood sugar (diabetic retinopathy) [R].

242



L-Tyrosine

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 500-2000 mg of L-Tyrosine supplement daily, preferably 30 minutes before meals or snacks. This can be taken in one dose or divided into two doses throughout the day. Continue this supplementation daily for a duration of at least a few weeks to assess its effects on your body.

TYPICAL STARTING DOSE

500 mg

Description

L-tyrosine is an amino acid used by the body to produce important neurotransmitters and hormones. It may help improve cognitive function, stress response, and overall mood regulation.

Tyrosine is a **non-essential amino acid**. This means that our bodies can make it from other amino acids like [phenylalanine](#). We can also get tyrosine from **protein-rich foods**, such as [\[R, R\]](#):

- Red meat and poultry
- Dairy, especially cheese
- Legumes (e.g., soybeans and beans)
- Fish
- Nuts
- Eggs

Tyrosine can also be taken as a supplement. People often use it to maintain mental performance during demanding and stressful tasks [\[R, R, R\]](#).

How it helps

Genetically higher levels of tyrosine may be associated with a lower risk of high blood sugar [\[R, R\]](#).

Please note: The long-term safety of L-tyrosine supplementation in daily doses above **150 mg/kg** is unclear. That is about **1 g/day** for a 70-kg person.

Please note: *There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.*

243



Limit Salt Intake

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Reduce your daily salt intake to less than 2,300 milligrams (mg), equivalent to about one teaspoon of table salt. This includes all salt consumed, whether added during cooking, at the table, or present in processed and ready-to-eat foods.

Description

Limiting salt intake involves lowering the amount of sodium in the diet, which can help lower blood pressure and reduce the risk of heart disease. It often involves avoiding processed and other high-sodium foods such as cured meats, soups and sauces, and various pickled foods.

Your body needs a certain amount of sodium to function. For example, it helps support your blood pressure. This sodium usually comes from [salt](#). However, eating too much salt is linked to an increased risk of stroke and heart disease [\[R\]](#), [\[R\]](#).

Foods higher in salt include [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Prepared soups, broths, gravies, and sauces
- Fermented or pickled foods (such as pickles, soy sauce, olives, and [capers](#))
- Cured meats and sausages (such as bacon, salt pork, and salami)
- Cheese (such as Roquefort and Parmesan)

Try to limit your daily intake to 1 teaspoon of salt (2,400 mg of sodium) [\[R\]](#).

How it helps

Genetically higher urinary sodium may be causally associated with type 2 diabetes [\[R\]](#).

Please note: *There is no evidence from controlled clinical trials to support this recommendation. It is included based on uncontrolled clinical trials, animal or cell studies, or non-scientific criteria. Please take this recommendation with a grain of salt until more research is available.*

244



Calcium Supplements

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 500-600 mg of calcium supplement twice daily with food. For best absorption, do not exceed 600 mg at one time and ensure a total daily intake of 1000-1200 mg from all sources, including diet. Continue indefinitely for ongoing support of bone health.

TYPICAL STARTING DOSE

1000 mg

Description

Calcium supplements are commonly used to support bone health and prevent conditions like osteoporosis. Adequate calcium intake is essential for maintaining strong bones and teeth.

[Calcium](#) is the most abundant mineral in the human body. It is vital for the bones, heart, muscles, and nervous system [\[R\]](#).

Your body gets calcium from food and needs vitamin D to help absorb it. Calcium can be found in a variety of foods, including [\[R\]](#):

- Dairy products
- Green, leafy vegetables
- Fish with edible soft bones (e.g., sardines)
- Calcium-fortified foods and beverages

How it helps

In a randomized controlled trial at a teaching hospital, 70 women with gestational diabetes at 24-28 weeks of pregnancy were divided into two groups. Group A received vitamin D 1000 IU and calcium 1000 mg daily, while Group B received vitamin D 250 IU and calcium 500 mg daily for 6 weeks. Group A showed significant reductions in fasting glucose, fasting serum insulin, LDL, and total cholesterol levels, and an increase in HDL levels. Group B only showed a significant decrease in fasting glucose after 6 weeks of supplementation [\[R\]](#).

However, genetically predicted higher serum calcium levels may be associated with an increased risk for diabetes [\[R\]](#).

Please note: calcium competes with iron for absorption in the intestines, potentially exacerbating anemia or making it harder to manage. If you have anemia, consult your healthcare provider before using calcium supplements.

245

Grounding (Earthing)

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Walk barefoot on natural surfaces like grass, sand, or soil for 30 minutes daily, ensuring direct skin-to-earth contact. Alternatively, while indoors, use grounding products such as mats or sheets connected to the earth's surface via a grounding wire for at least 8 hours, ideally during sleep.

TYPICAL STARTING DOSE

30 minutes

Description

Earthing, or grounding, involves direct physical contact with the Earth's surface, such as walking barefoot on soil or grass. Advocates suggest that it can help reduce inflammation, improve sleep, and promote overall well-being.

How it helps

In a non-placebo-controlled trial of 12 participants with non-insulin-dependent diabetes, grounding for 72 hours lowered fasting glucose [\[R\]](#).

246

Avoid BCAA Supplements

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Do not purchase or consume branched-chain amino acid (BCAA) supplements, which are often found in the form of powders, pills, or energy bars marketed for muscle building and recovery. Check the labels of your dietary supplements and sports nutrition products to ensure they do not contain BCAAs.

Description

BCAA supplements, which are amino acids, aren't needed for most people as they're generally gotten from a balanced diet. If you rely on these for muscle build-up, they might push your body to produce less muscle-supporting hormones. Plus, too much BCAA can potentially harm the kidneys over time. For overall health, eat a variety of nutritious foods instead.

How it helps

Genetically higher BCAAs levels may be associated with an increased risk of diabetes [\[R\]](#).

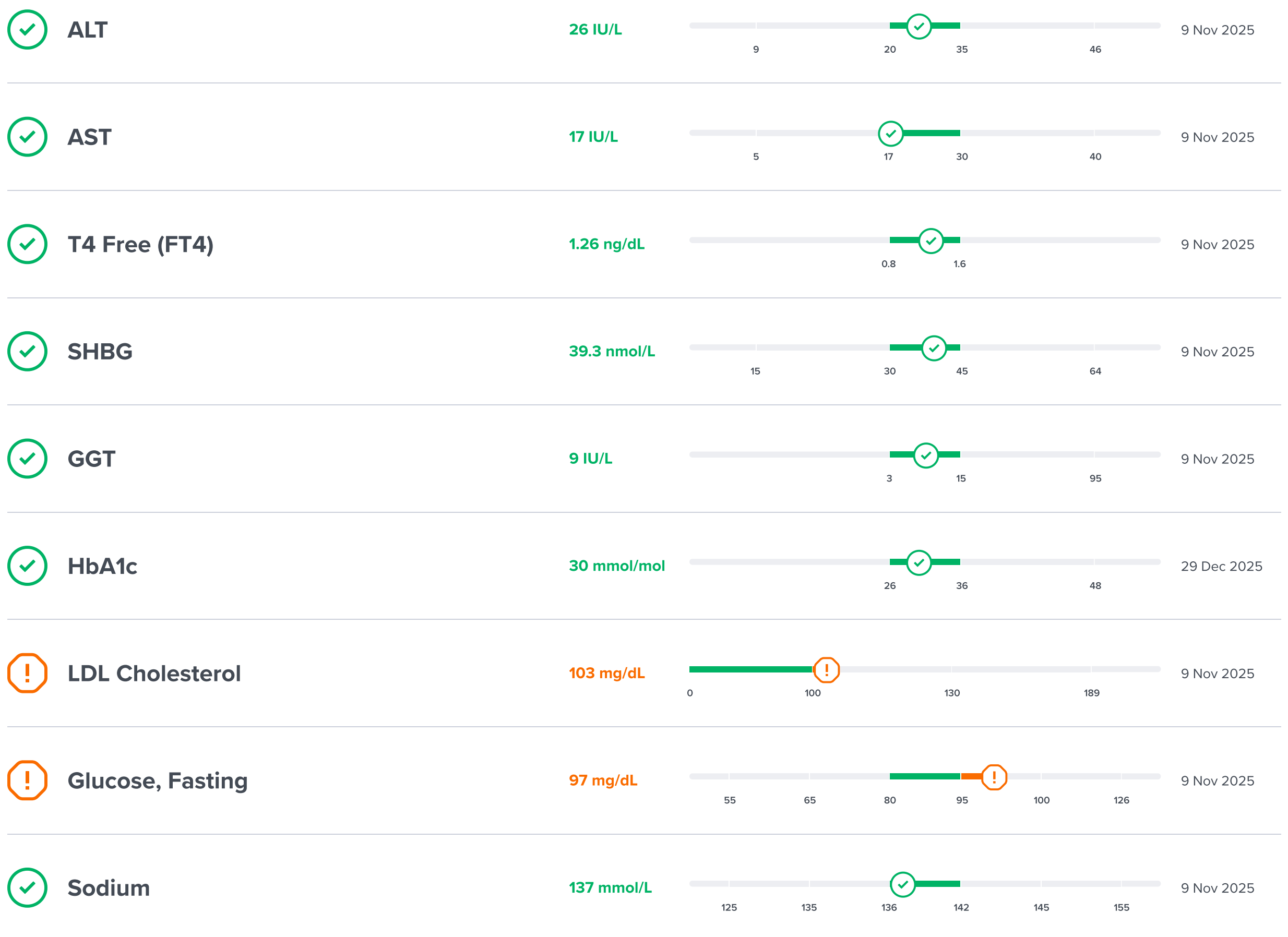
Please note: *There is not enough safety data for long-term BCAA supplementation at doses above 12 g/day. Increased BCAA intake may be linked to type 2 diabetes* [\[R\]](#).

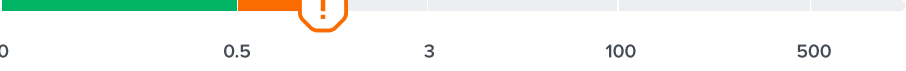
Remember, your genes only tell one important part of your health story!

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 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.



	Neutrophils (Absolute)	4.8 x10^9/L		9 Nov 2025
	Albumin	4.3 g/dL		9 Nov 2025
	Insulin, Fasting	9.08 uU/mL		9 Nov 2025
	Potassium, Serum	5.2 mmol/L		9 Nov 2025
	hs-CRP	1.6 mg/L		9 Nov 2025
	Testosterone, Total	1500 ng/dL		9 Nov 2025
	Calcium	9.2 mg/dL		9 Nov 2025
	HbA1c (%)	4 %		29 Dec 2025
	Iron	228 mcg/dL		9 Nov 2025
	Albumin, Urine	87.6 ug/mL		9 Nov 2025

Your Lifestyle Assessments

Ever heard of the term Nature vs. Nurture?

The thing is, both DNA and environment play a role in determining your health risks. The following assessments shows how much of an impact your lifestyle, environment and medical history are having on your health risks.

✓

LIFESTYLE

You have a **reduced risk** of diabetes based on the answers you provided.

Your Lifestyle Risk

LowDecreasedAverageIncreasedHigh

Factors impacting your risk:

How much alcohol do you drink on a typical day? Calculate your alcohol consumption in units here 0 units	Increasing Risk !
How many servings of whole grains do you eat in a typical day? Please click here for more information on whole grain servings Less than 3	Increasing Risk !
How many cups of coffee do you drink on a typical day? 0	Increasing Risk !
In a typical week, how many times do you participate in any physical activities or exercise for 30 minutes at a time? (such as walking, running, bike riding, weight training, yoga, etc.) *Note: longer exercise equals more sessions (e.g., 1 hour = 2 sessions) 8 or more	Decreasing Risk ✓
Do you smoke tobacco? No, never	Decreasing Risk ✓
Do you have a parent or sibling who has ever been diagnosed with diabetes? No	Decreasing Risk ✓
What is your waist size? Less than 35 (less than 89 cm)	Decreasing Risk ✓
How many times in a typical day do you eat refined grains (e.g., white pasta, white rice, white bread, etc.)? 0-2	Decreasing Risk ✓
How much sleep do you get in a typical night? 7-8 hours	Decreasing Risk ✓
Have you recurrently been diagnosed with high triglycerides? No	Decreasing Risk ✓

What is your ethnicity? Ashkenazi Jewish	Decreasing Risk 
Your BMI: 22.77	Decreasing Risk 
What is your height? 165 cm	No impact 
What is your current weight? 62.0 kg	No impact 
What is your sex? Male	No impact 