

HbA1c

Biohacker Report

REPORT CATEGORY —



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

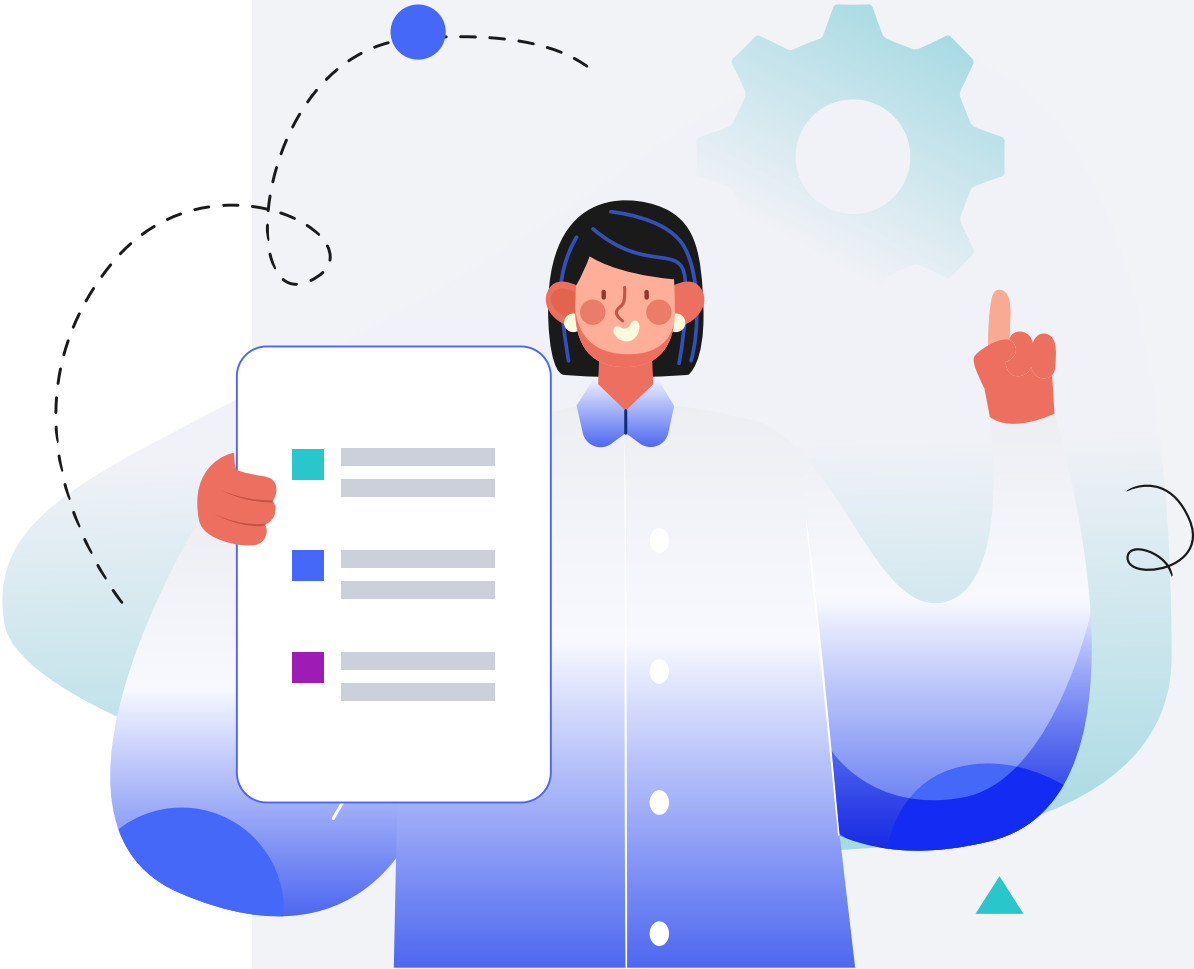
Male

HEIGHT

5ft 5" 165cm

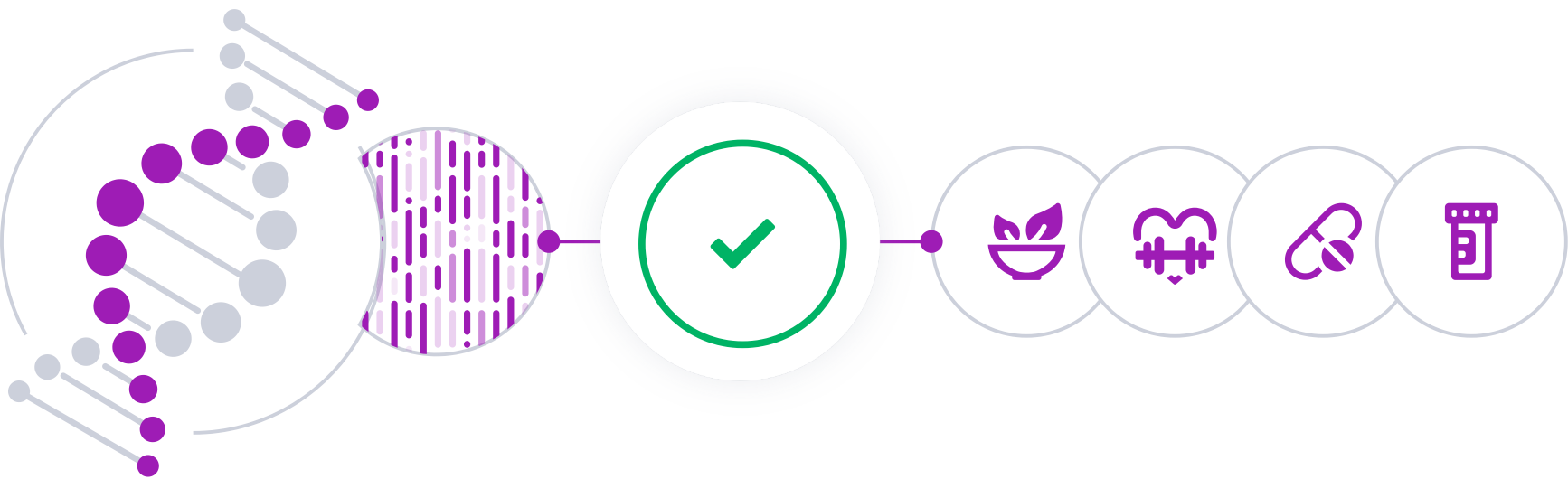
WEIGHT

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.

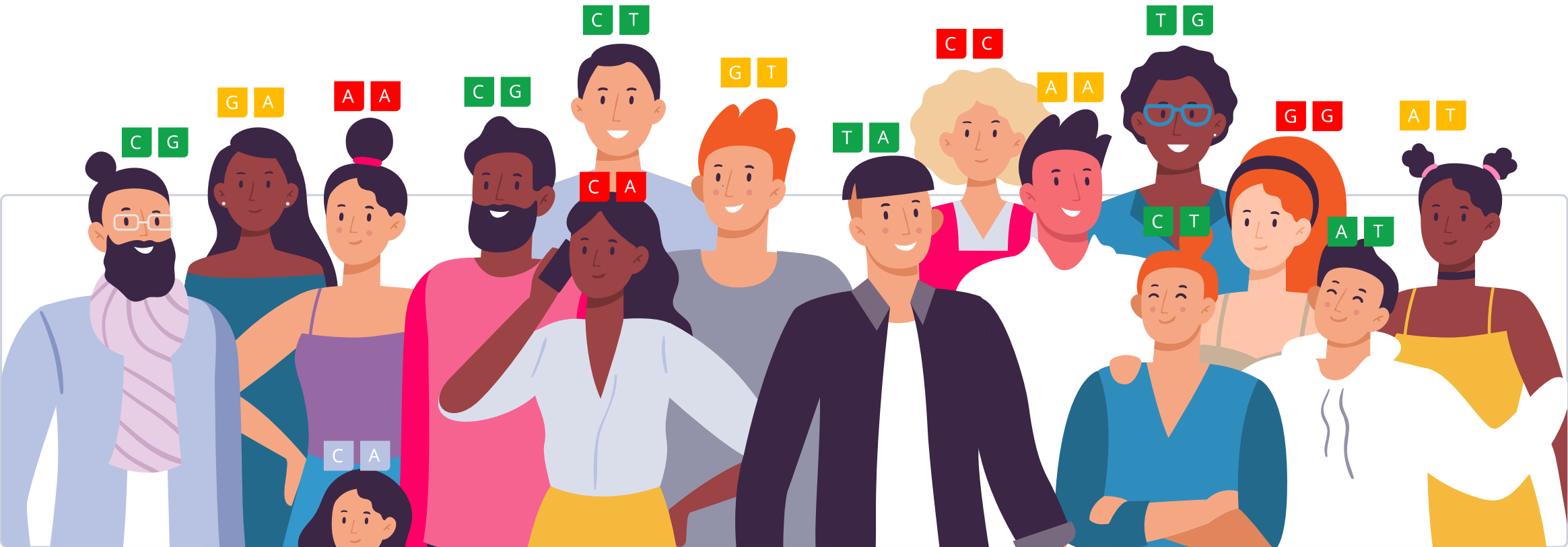


Similarly, our Trait Reports look at how your DNA influences your traits.



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

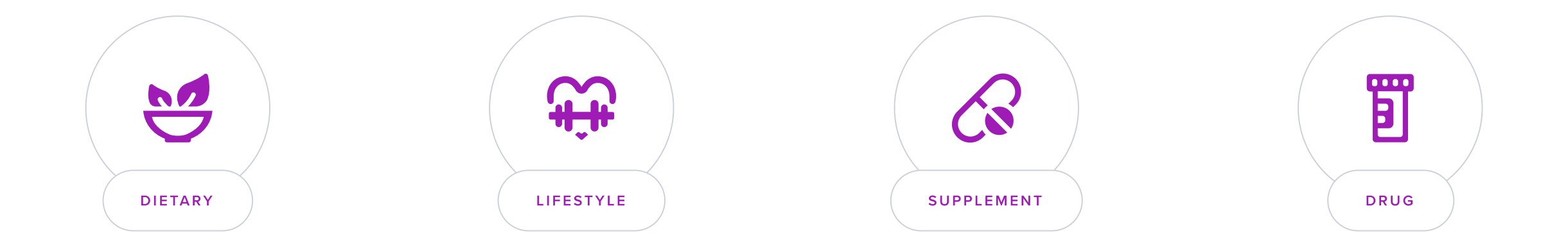
You have 2 risk alleles

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

Sugar in the blood can stick to **hemoglobin**, a protein that helps red blood cells transport oxygen around the body. Hemoglobin with sugar stuck to it is called **glycated hemoglobin (HbA1c** or A1c) [\[R\]](#).

HbA1c percentage reflects the average amount of sugar in your blood over the past 8-12 weeks. The higher the percentage, the higher your blood sugar. Testing HbA1c levels helps doctors diagnose prediabetes or diabetes. Specifically [\[R\]](#), [\[R\]](#):

- Levels below 5.7% are normal
- **Levels between 5.7% and 6.4% indicate prediabetes**
- **Two independent tests showing HbA1c levels above 6.5% indicate diabetes**

High HbA1c Levels

Sugar in the blood can stick to **hemoglobin**, a protein that helps red blood cells transport oxygen around the body. Hemoglobin with sugar stuck to it is called **glycated hemoglobin (HbA1c or A1c)**. HbA1c percentage reflects the average amount of sugar in your blood over the past 8-12 weeks. The higher the percentage, the higher your blood sugar [\[R, R, R\]](#).

A doctor might order blood sugar tests like HbA1c if any of the following risk factors apply to you [\[R, R\]](#):

- 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

If you’re at risk of diabetes, your doctor may advise you to lose weight and change your diet. **Eating less sugar is usually the first step.** If your blood sugar is very high, your doctor may also prescribe medications [\[R, R\]](#).

Up to 75% of the differences in people's HbA1c levels can be attributed to genetics. Genes involved in glucose metabolism may contribute to higher HbA1c levels [\[R, R, R\]](#).



TYPICAL LEVELS

Predisposed to typical HbA1c levels based on 967,688 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
CCND2	rs76895963	TT
ANKH	rs146886108	CC
H2BC5	rs144861591	CC
HNRNPUL1	rs180958600	AA
G6PC2	rs560887	CC
SOS2	rs72681869	GG
UBE2V2	rs113440580	CC
GYPC	rs111631066	GG
KEL	rs4987703	CC
GLP1R	rs10305492	GG
MSTN	rs191148279	GG
THADA	rs41382648	CC
NUDCD3	rs1985469	TA
SLC30A8	rs13266634	CC
ADCY5	rs11708067	AA
CCND1	rs74606104	GG
SLC22A23	rs112136863	AG
PFKM	rs4760682	CA
TCF7L2	rs35198068	TC
FN3KRP	rs9909940	TC
MTNR1B	rs10830963	CG
PIEZO1	rs837763	TC
OCEL1	rs12984096	CG
HK1	rs17476364	TT
PFKL	rs17850433	TT
SPTA1	rs2852635	GG
ATP11A	rs76533333	AA
PAX4	rs2233580	CC
ANK1	rs4737010	GG
ARPC1B	rs117370443	TT
PDE3B	rs539505257	GG
UBXN2A	rs72781679	GG

GENE	SNP	GENOTYPE
MAP3K15	rs56212339	T
GSN	rs1560980	GG
CDKAL1	rs35261542	CC

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	Exercise At Least One Hour a Day	1 hour	2	Aerobic Exercise (Cardio)	1 hour
3	Avoid Sugary Foods & Drinks		4	Keto Diet	
5	Zinc	10 mg	6	Low-Carbohydrate Diet	
7	Eat Fiber-Rich Foods		8	Mediterranean Diet	
9	Pistachios		10	Pycnogenol	100 mg
11	Black Seed Oil	2 tsp	12	Resistant Starch	40 g Hi-Maize
13	Milk Thistle (Silymarin)	300 mg	14	Psyllium	5 g
15	Berberine	500 mg	16	Black Seed (Black Cumin)	1000 mg
17	Vitamin C	500 mg	18	Gymnema	200 mg
19	Resveratrol	150 mg	20	Betaine (TMG)	500 mg
21	Aloe Vera	50 mg	22	Ginger	500 mg
23	Yoga	30 minutes	24	Good Oral Hygiene	2 minutes
25	Curcumin	500 mg	26	Sleep for 7+ Hours	
27	Vanadium		28	Relaxation Techniques	30 minutes
29	Walking	30 minutes	30	Poria	
31	Kimchi		32	Bitter Melon Supplement	500 mg

33	Mulberry		34	Guar Gum	5 g
35	Magnesium	350 mg	36	Biotin And Chromium Picolinate	
37	Lactobacillus Plantarum	10 billion CFU	38	Passion Fruit Flour	30 g
39	Strength Training	1 hour	40	Avoid Perchlorate	
41	Honey		42	L-Carnitine	500 mg
43	Jujube	250 mg	44	Carnosine	1000 mg
45	Magnesium Chloride	200 mg	46	Cardamom	500 mg
47	Pilates	30 minutes	48	Propolis	
49	Sweet Potatoes		50	Hatha Yoga	1 hour
51	Whole-Body Vibration	15 minutes	52	Tocotrienols	100 mg
53	Omega-3 (Fish Oil)	2000 mg	54	Cranberry	
55	Intermittent Fasting		56	Alpha-Lipoic Acid	100 mg
57	Lactobacillus Rhamnosus	10 billion CFU	58	Saffron	20 mg
59	Walking Meditation	30 minutes	60	Glutamine	5 g
61	Hyperbaric Oxygen Therapy	90 minutes	62	Fucoxanthin	3 mg
63	Eriocitrin	500 mg	64	Okra	
65	Artemisia Extract	200 mg	66	Chlorella	3 g
67	Restorative Yoga	30 minutes	68	Magnesium Citrate	200 mg
69	Red Clover	40 mg	70	Chicory	
71	L-Citrulline	3 g	72	Ubiquinol	100 mg

73	Beta-Alanine	2 g	74	Iyengar Yoga	1 hour
75	Bifidobacterium Animalis Subsp. Lactis	10 billion CFU	76	Neem	300 mg
77	Olive Leaf Extract	500 mg	78	Fasting Mimicking Diet	
79	Chamomile	300 mg	80	Lactobacillus Rhamnosus GG	10 billion CFU
81	Sage Extract	300 mg	82	Brown Seaweed And Bladderwrack	500 mg
83	American Ginseng	200 mg	84	Glycine	3 g
85	Laughter Yoga	30 minutes	86	Diaphragmatic Breathing	10 minutes
87	Black Chokeberry		88	Fucoidan	300 mg
89	Biotin	30 mcg	90	Rutin	
91	Akkermansia		92	Maintain Optimal Vitamin D Levels	1000 iu
93	Whey Protein	25 g	94	Limit Calorie Intake	
95	Dietary Vitamin E		96	Whole-Grain Rice	
97	Avocado		98	Blueberries	
99	Beta-Glucans		100	Avoid Rapid Weight Changes	
101	Brown Seaweed	500 mg	102	Oat Bran	
103	Ivy Gourd	300 mg	104	Inulin	5 g
105	Mindfulness	30 minutes	106	Salacia	240 mg
107	Moringa	400 mg	108	Caper Fruit Extract	400 mg
109	Allulose	30 g	110	Yerba Mate	1 g
111	Apple Cider Vinegar		112	Whole Grains	

113	Aquatic Exercise	1 hour	114	Meditation	30 minutes
115	Oats		116	Broccoli	
117	Green Tea Extract	250 mg	118	Brazil Nuts	
119	Paleo Diet		120	Bladderwrack	300 mg
121	Cognitive-Behavioral Therapy (CBT)		122	Green Jackfruit Flour	
123	Chromium	200 mcg	124	Practice Exercise Snacks	1 minutesute
125	Mindfulness-Based Stress Reduction (MBSR)	2 hours	126	Legumes	
127	Fenugreek	500 mg	128	Spinach	
129	Almonds				

1



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

Experts recommend exercise to reduce blood sugar. Getting 150 minutes of exercise per week may be best [\[R, R, R\]](#).

The following types of exercise may help reduce HbA1c:

- Cardio [\[R, R, R\]](#)
- Resistance training [\[R, R, R\]](#)
- Yoga [\[R, R, R, R\]](#)
- High-intensity interval training (HIIT) [\[R, R, R\]](#)

When you exercise, your muscles use up sugar for energy. Exercise also makes your cells more sensitive to insulin [\[R, R\]](#).

 PERSONALIZED TO YOUR GENES

Exercise may reduce HbA1c more in people with your [PPARG](#) gene variant [\[R\]](#).

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

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
DEF6	rs2267668	GA	
LEPR	rs1137100	AG	

2



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

Experts recommend exercise to reduce blood sugar. Getting 150 minutes of exercise per week may be best [\[R, R, R\]](#).

For instance, aerobic exercise may lower HbA1c by 0.3-0.8%. Its combination with strength training may be more effective [\[R, R, R\]](#).

When you exercise, your muscles use up sugar for energy. Exercise also makes your cells more sensitive to insulin [\[R, R\]](#).

3



Avoid Sugary Foods & Drinks

IMPACT

4 / 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 raise HbA1c levels** [R](#), [R](#), [R](#).

Experts recommend that people with diabetes avoid sugary foods. This may help lower HbA1c [R](#), [R](#), [R](#), [R](#), [R](#), [R](#).

Specific diets that limit sugary foods and may help lower HbA1c include:

- Paleo diet [R](#), [R](#), [R](#)
- [Mediterranean diet](#) [R](#), [R](#), [R](#)
- Keto diet [R](#), [R](#), [R](#), [R](#)

4



Keto Diet

IMPACT

4 / 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

Following the keto diet (for at least 4 weeks) may help lower HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

In people with elevated HbA1c, the ketogenic diet may also help [\[R\]](#), [\[R\]](#):

- Reduce hunger
- Support weight loss

By limiting carb intake, the ketogenic diet may reduce blood sugar and insulin resistance [\[R\]](#), [\[R\]](#).

Please note: *Consult a doctor before changing your diet. The keto diet can significantly lower blood sugar levels, so people with diabetes should be carefully monitored in case their blood sugar levels become too low. Following this diet for too long may affect the liver, bones, and kidneys and may increase the risk of nutrient deficiencies* [\[R\]](#).

5



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

Zinc supplements (25-40 mg/day for at least 3 months) may help support healthy HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Zinc may help by improving sensitivity to insulin [\[R\]](#), [\[R\]](#), [\[R\]](#):

Please note: Both low and high blood zinc levels have been linked to an increased risk of diabetes. A high intake of zinc may cause stomach pain and gut irritation. Medical bodies recommend against taking more than **40 mg** of zinc per day [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Your [SLC30A8](#) gene variant is linked to high blood sugar. People with this variant may benefit more from increasing zinc intake [\[R\]](#), [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
SLC30A8	rs11558471	AA	

6



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 low-carb diet helps to prevent high HbA1c levels by reducing the intake of foods that spike blood sugar levels. This helps stabilize blood sugars, which in turn, controls your HbA1c, reducing the risk of diabetes and improving diabetes management.

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 mIU/mL)** [\[R\]](#).

7



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

Fiber may help reduce blood sugar. **People who eat more fiber may have lower HbA1c levels** [\[R, R, R, R\]](#).

This may be because **fiber delays the absorption of sugar**, which prevents blood sugar spikes. Fiber also increases the amount of “good” bacteria in the gut that help lower HbA1c [\[R, R, R\]](#).

High-fiber foods that may help lower HbA1c include:

- Whole grains [\[R, R\]](#)
- Oats [\[R, R, R\]](#)
- Fenugreek seeds [\[R, R, R, R\]](#)
- Pulses (beans, chickpeas, lentils) [\[R, R\]](#)

Fiber supplements that may have similar benefits include:

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

8



Mediterranean Diet

IMPACT3 / 5

EVIDENCE4 / 5

How to implement

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

Description

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

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

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

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

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

How it helps

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

In line with this, **the Mediterranean diet may help lower HbA1c levels.** Components of this diet, such as [olive oil](#), may also help lower HbA1c [\[R, R, R, R, R, R\]](#).

This may be because the Mediterranean diet is low in sugary foods. It may also help lower inflammation [\[R, R\]](#).

9



Pistachios

IMPACT3 / 5

EVIDENCE3 / 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

Pistachios are low in carbohydrates and high in healthy fats, protein, and fiber, which can aid in the control of blood sugar levels. Therefore, it may contribute to a lower Hemoglobin A1c (HbA1c), indicating better long-term blood glucose control.

Four meta-analyses (the largest one with 17 studies) concluded that consuming pistachios lowers fasting glucose (by 3.62-5.32 mg/dL), insulin (by 1.86 µIU/mL), insulin resistance, and HbA1c. However, the results were mixed for insulin resistance and HbA1c [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

10



Pycnogenol

IMPACT3 / 5

EVIDENCE3 / 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, a supplement derived from pine bark, has demonstrated potential to lower HbA1c levels, which are used to monitor long-term blood glucose control in people with diabetes. By reducing these levels, Pycnogenol could contribute to better glucose management and decrease risk of diabetic complications.

A [meta-analysis of 24 trials and 1594 participants](#) concluded that supplementation with pycnogenol (150-200 mg/day for 8-24 weeks) **reduces HbA1c (by 0.29%)** [\[R\]](#)

In a [placebo-controlled trial of 46 patients with type 2 diabetes](#), French maritime pine bark extract (50 mg/day for 8 weeks) **reduced HbA1c** [\[R\]](#).

11



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

Black seed may help support healthy HbA1c levels. Studied forms include [\[R\]](#), [\[R\]](#):

- Black seed oil
- Black seed powder

Black seed may help by:

- Increasing the removal of sugar from the blood [\[R\]](#)
- Reducing how much sugar is absorbed by the gut [\[R\]](#)

Please note: *Black seed may interact with some medications. Consult your doctor before taking black seed* [\[R\]](#).

12



Resistant Starch

IMPACT

3 / 5

EVIDENCE

3 / 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 can help lower HbA1c, a measure of long-term blood sugar control, by slowing digestion and absorption of carbohydrates. This reduces the overall blood sugar response, which in turn helps improve HbA1c levels.

Two meta-analyses (the largest one with 19 studies) concluded that supplementation with resistant starch (typically, 10-45 g/day for 4-12 weeks) **lowers HbA1c in people with metabolic disorders such as overweight/obesity or metabolic syndrome** [\[R\]](#) [\[R\]](#).

13



Milk Thistle (Silymarin)

IMPACT

3 / 5

EVIDENCE

3 / 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

Milk thistle (100-1,000 mg/day for at least 6 weeks) may help support healthy HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

It may help by lowering blood sugar production in the body and making the body more sensitive to insulin [\[R\]](#), [\[R\]](#).

Please note: *Avoid milk thistle if you’re allergic to ragweed, daisies, or chrysanthemums. Because it belongs to the same plant family, it may cause similar reactions. People with diabetes or some forms of cancer should talk to their doctor before taking milk thistle. Milk thistle may also interact with some medications* [\[R\]](#), [\[R\]](#).

14



Psyllium

IMPACT3 / 5

EVIDENCE3 / 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.

15



Berberine

IMPACT

3 / 5

EVIDENCE

3 / 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 (1,000-2,000 mg/day for 8-12 weeks) may help support healthy HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

It may help by increasing insulin sensitivity [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

16



Black Seed (Black Cumin)

IMPACT3 / 5

EVIDENCE3 / 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

Black seed may help support healthy HbA1c levels. Studied forms include [\[R\]](#), [\[R\]](#):

- Black seed oil
- Black seed powder

Black seed may help by:

- Increasing the removal of sugar from the blood [\[R\]](#)
- Reducing how much sugar is absorbed by the gut [\[R\]](#)

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 [\[R\]](#).

Please note: *Black seed may interact with some medications. Consult your doctor before taking black seed* [\[R\]](#).

17



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

Vitamin C can help improve the body's response to insulin, which can help reduce HbA1c levels in individuals with diabetes. This vitamin is also an antioxidant, helping to protect cells from damage, which could potentially prevent diabetes from developing.

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 (MR):

- High Blood Sugar [\[R\]](#).

In conclusion, insufficient dietary VC intake potentially increased the MetS and hyperglycemia risk in Asian adults.

Null (MR): *Type 2 Diabetes* [\[R\]](#).

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

18



Gymnema

IMPACT3 / 5

EVIDENCE3 / 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, gurmar, 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 meta-analysis of 10 studies and 419 patients with type 2 diabetes concluded that supplementation with *Gymnema sylvestre* lowers HbA1c and fasting glucose [\[R\]](#).

Gymnema is known to help reduce high blood sugar levels, potentially lowering HbA1c levels. Studies suggest it works by reducing the absorption of sugar from the intestine and boosting insulin production.

19



Resveratrol

IMPACT3 / 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

Supplementation with resveratrol for at least 3 months may reduce HbA1c and other metabolic risk factors in healthy subjects [\[R, R\]](#).

Resveratrol may also lower HbA1c in patients with type 2 diabetes, both alone and as an add-on to pharmacological treatments. Doses of 250-500 mg/day may help in patients aged 45-59 years old but not in older patients [\[R, R, R, R, R, R\]](#).

Resveratrol may help by improving insulin sensitivity.

20



Betaine (TMG)

IMPACT3 / 5

EVIDENCE3 / 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

Betaine, also known as Trimethylglycine, helps with the condition HbA1c by improving insulin function, which helps control blood sugar levels. Regular use can potentially prevent the progression of HbA1c, which is a marker of long-term blood sugar control.

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

21



Aloe Vera

IMPACT

3 / 5

EVIDENCE

2 / 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 support healthy HbA1c levels. Studied forms include [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Leaf gel powder (100-1,000 mg/day for 8-12 weeks)
- Freshly extracted juice (15-150 mL/day for 5-12 weeks)
- Extract tablets (300-500 mg/day for 8 weeks)

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

- Helping muscle cells remove sugar from the bloodstream
- Improving sensitivity to insulin

22



Ginger

IMPACT

3 / 5

EVIDENCE

2 / 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

Ginger (1,200-3,000 mg /day for 1-3 months) may help support healthy HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

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

- Reducing how much sugar is absorbed and produced in the body
- Increasing sugar removal from the blood

23



Yoga

IMPACT

2 / 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 has been linked to higher HbA1c and a greater risk of diabetes [\[R, R, R\]](#).

Stress hormones like cortisol contribute to insulin resistance and raise blood sugar levels [\[R, R\]](#).

Reducing stress with yoga modalities such as Hatha yoga may help lower HbA1c levels [\[R, R, R, R\]](#).

24



Good Oral Hygiene

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Brush your teeth at least twice a day for two minutes each time using fluoride toothpaste. Floss daily to remove plaque from places your toothbrush can't reach and consider using mouthwash. Visit your dentist at least twice a year for professional cleanings and checkups.

TYPICAL STARTING DOSE

2 minutes

Description

Good oral hygiene, which includes regular brushing, flossing, and dental check-ups, is crucial for preventing tooth decay, gum disease, and maintaining overall oral health. A healthy mouth contributes to overall well-being and can prevent dental issues that may impact systemic health.

Oral hygiene refers to practices that keep the mouth healthy. Good habits include [\[R\]](#), [\[R\]](#):

- Gently brushing the teeth and tongue for two minutes, at least twice a day
- Flossing daily
- Using a toothpaste with fluoride and a soft toothbrush
- Replacing a worn toothbrush at least every 3 months

To help maintain good oral hygiene, it is also important to regularly see dental professionals. They can help prevent and address issues with your teeth and gums.

How it helps

People with gum disease or people who don't brush their teeth regularly may have higher HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#).

Treating gum disease may lower HbA1c in people with diabetes [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Gum disease creates inflammation, which may cause blood sugar to rise [\[R\]](#).

25



Curcumin

IMPACT2 / 5

EVIDENCE3 / 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 4,000 mg/day for 3-9 months) may help support healthy HbA1c levels [R, R, R, R, R, R, R, R, R, R, R, R, R].

It may help by [R, R]:

- Making the body more sensitive to insulin
- Decreasing how much sugar is made in the body
- Protecting against oxidative stress

However, curcumin didn’t reduce HbA1c in some studies [R, R].

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].

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].

26



Sleep for 7+ Hours

IMPACT2 / 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

Healthy sleep is crucial for blood sugar control. The following sleep problems may be linked to higher HbA1c and diabetes:

- Too little sleep [R, R]
- Poor sleep quality [R, R]
- Insomnia [R]
- Breathing problems during sleep (obstructive sleep apnea) [R, R, R]

In line with this, **experts recommend getting at least 7 hours of high-quality sleep to help control blood sugar** [R].

Sleep deprivation and poor sleep quality may raise blood sugar by causing insulin resistance [R, R, R, R].

However, some studies didn’t find a link between sleep issues and blood sugar control [R, R].

27



Vanadium

IMPACT2 / 5

EVIDENCE3 / 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 [\[R\]](#).

28



Relaxation Techniques

IMPACT2 / 5

EVIDENCE3 / 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 has been linked to higher HbA1c and a greater risk of diabetes [\[R, R, R\]](#).

Stress hormones like cortisol contribute to insulin resistance and raise blood sugar levels [\[R, R\]](#).

Reducing stress with the following strategies may help lower HbA1c:

- Mindfulness [\[R, R, R, R\]](#)
- Yoga [\[R, R, R, R\]](#)

29

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

Walking helps to lower HbA1c levels by enhancing insulin sensitivity, leading to better glucose control in people with diabetes. Regular walking also aids in keeping body weight in check, which is essential in managing diabetes.

Meta-analysis of 20 RCTs in 866 type 2 diabetes patients showed walking lowered HbA1c by 0.50%. Supervised walking (-0.58%) and non-supervised with motivational strategies (-0.53%) were effective. It also reduced BMI and diastolic BP but had mixed effects on other factors [R].

Meta-analysis of 37 RCTs (2001 participants)showed walking benefits 7 CVD risk factors (e.g., BMI, blood pressure). No clear dose-response relationship was identified, and there was insufficient evidence to specify optimal walking parameters [R].

30

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 HbA1c levels [R].

Poria may influence insulin sensitivity and glucose metabolism. Over time, this can lower HbA1c.

31



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

Kimchi, a fermented vegetable dish, can benefit HbA1c levels by improving blood glucose control due to its probiotic content. It thus could help in managing diabetes, as high HbA1c levels point to poor control of blood sugar levels.

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

32



Bitter Melon Supplement

IMPACT

2 / 5

EVIDENCE

2 / 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

Bitter Melon Supplement can help lower HbA1c levels in individuals with diabetes as it contains compounds that act like insulin, helping to bring down blood sugar levels. A decrease in HbA1c correlates with better blood sugar control, potentially delaying the onset of diabetes complications.

A meta-analysis of 10 studies on type 2 diabetes (n=1045) found that M. charantia monoherbal formulation significantly reduced FPG, PPG, and HBA1c compared to placebo, with moderate to high bias risk. In prediabetes, it lowered FPG, but evidence quality was low due to unclear bias risk and a small sample size [\[R\]](#).

33



Mulberry

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a mulberry supplement at a dosage of 500mg to 1,000mg per day, preferably with meals to enhance absorption. This should be continued daily for at least 3 months to observe potential health benefits.

Description

Mulberries are the fruit of the mulberry tree, often used in traditional medicine and cuisine. It is a source of vitamins and antioxidants, potentially offering health benefits such as blood sugar control and immune support.

How it helps

A meta-analysis of 12 trials concluded that mulberry consumption lowers HbA1c levels [\[R\]](#).

Mulberry contains a compound called DNJ that can help lower high blood sugar by slowing down the breakdown of sugars in your gut.

34



Guar Gum

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 5-10 grams of guar gum with at least 8 ounces of water. Start with a lower dose to assess your tolerance, then gradually increase as needed. It is best taken before meals, up to three times a day.

TYPICAL STARTING DOSE

5 g

Description

Guar gum is a soluble fiber derived from guar beans and is commonly used as a food thickener and stabilizer. Its ability to slow down digestion and promote a feeling of fullness can be beneficial for managing appetite and supporting digestive health when consumed as part of a balanced diet.

Guar gum is a fiber made from the seeds of the Indian cluster bean (*Cyamopsis tetragonolobus*). It is used in food products to help bind and thicken them [\[R\]](#).

Guar gum may help with blood pressure control and support the immune system [\[R\]](#).

How it helps

Guar gum can slow down the digestion of carbohydrates, which in turn reduces the overall rise in blood glucose after a meal. Regular intake of guar gum may thus help in maintaining lower levels of HbA1c, a measure of long-term blood glucose control, especially in diabetics.

A meta-analysis of 14 randomized controlled trials found that guar gum supplementation significantly reduced hemoglobin A1c (HbA1c) by -0.47 mg/dL but had no impact on fasting blood sugar (FBS), blood pressure, or body mass [\[R\]](#).

35



Magnesium

IMPACT

2 / 5

EVIDENCE

2 / 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

350 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 Citrate can aid in controlling blood sugar levels, thereby reducing HbA1c, a measure of long-term blood sugar control. It works by enhancing insulin sensitivity and promoting the function of insulin, hormones that help regulate blood glucose.

In a 12-week trial involving 24 individuals with metabolic syndrome, magnesium citrate (400mg/day) increased plasma magnesium, lowered blood pressure (systolic and diastolic), reduced HbA1c, and boosted serum vitamin D levels compared to placebo [\[R\]](#).

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 [\[R\]](#).

36



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 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.

37



Lactobacillus Plantarum

IMPACT2 / 5

EVIDENCE2 / 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

Lactobacillus Plantarum is a probiotic that can help manage your HbA1c levels by improving your body's insulin sensitivity, reducing inflammation, and aiding in the normal function of your gut. Consequently, it may lower your blood sugar levels over time, leading to a decrease in HbA1c.

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

38



Passion Fruit Flour

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Incorporate 30 grams of passion fruit flour into your diet daily. This can be achieved by adding it to smoothies, yogurt, or baked goods. Continue this supplementation for at least 8 weeks to observe potential health benefits such as improved glycemic control.

TYPICAL STARTING DOSE

30 g

Description

Passion fruit flour is made from the seeds and pulp of passion fruit, a tropical fruit originating from South America. It is rich in dietary fiber, vitamins, and antioxidants, making it a nutritious ingredient that can be added to various recipes to support digestive health, boost the immune system, and provide a natural source of essential nutrients like vitamin C and dietary fiber.

[[R](#), [R](#), [R](#)]

How it helps

A systematic review and meta-analysis of 11 studies found that turmeric flour and passion fruit peel flour (*Passiflora edulis* L.) helped with glycemic control (in the order of 0.73 and 0.32, respectively) assessed by glycated hemoglobin levels [[R](#)].

In a randomized, placebo-controlled, clinical trial with 89 patients with type 2 diabetes, yellow passion fruit albedo flour (500 mg capsules, 3x/day, at fasting for 120 days) got a higher reduction (-5.9%) of glycemia after fasting, compared to placebo (+9%), and long turmeric capsules (500 mg), merged with piperine (5 mg) (-3.2%). Both treatments also reduced HbA1c (-0.8%). However, turmeric reduced HOMA-IR (-9.4%) and serum triglyceride levels (-20.8%) unlike passion fruit [[R](#)].

A clinical trial with 43 type 2 diabetic volunteers found that yellow passion fruit peel flour (*Passiflora edulis* f. *flavicarpa* deg.) (30 g/day for 2 months) reduced fasting blood glucose and glycated hemoglobin, and HOMA IR, without changing insulin values for females. It also increased HOMA beta [[R](#)].

Passion fruit flour is high in fiber and pectin, which can help to slow down sugar absorption.

39

Strength Training

IMPACT

2 / 5

EVIDENCE

2 / 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

According to thirteen randomized controlled trials in people with abnormal glucose regulation, resistance training may reduce HbA1c and systolic blood pressure [R].

Strength training enhances your body's insulin sensitivity and aids glucose regulation, lowering HbA1c levels. It also helps in maintaining healthy body weight, a crucial factor in preventing diabetes, which is indicated by high HbA1c levels.

40



Avoid Perchlorate

IMPACT

2 / 5

EVIDENCE

2 / 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 perchlorate with a 53% higher risk of diabetes and higher fasting glucose, HbA1c, insulin, and insulin resistance [\[R\]](#).

Perchlorate can disrupt thyroid hormone production, which regulates metabolism.

41



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

Honey can help control HbA1c levels, an indicator of blood sugar levels over the past 2-3 months, by providing a smoother and slower increase in blood sugar compared to regular sugar due to its lower glycemic index. However, it should still be consumed in moderation because it is high in calories and sugars.

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

42



L-Carnitine

IMPACT2 / 5

EVIDENCE2 / 5

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 (200-3,000 g/day for 1-12 months) may help support healthy HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

However, some studies didn't find this benefit [\[R\]](#).

L-carnitine may help by reducing how much sugar is made by the body and increasing how much is broken down [\[R\]](#).

43



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

Jujube supplement may help people with high HbA1c levels because its bioactive compounds can improve insulin sensitivity and reduce blood sugar levels. However, always consult with your healthcare provider before starting any new supplement regimen.

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

44



Carnosine

IMPACT2 / 5

EVIDENCE2 / 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

Carnosine supplement can potentially lower HbA1c levels, which means better control over blood sugar levels for diabetics. It acts as an antioxidant and can prevent damage to proteins in the body, which, when uncontrolled, can lead to complications in diabetes.

A review of 20 studies (4 human, 16 rodent) on carnosine and beta-alanine supplementation suggests a decrease in fasting glucose, HbA1c, HOMA-IR, and fasting insulin levels, with moderate certainty in human outcomes [\[R\]](#).

Out of 14 selected papers, 9 qualified for meta-analysis, suggesting L-carnosine's potential therapeutic effects in age-related diseases. In diabetes mellitus, it led to significant reductions in HbA1c and fasting blood sugar, while in neurodegenerative disorders, it improved Wechsler Memory Scale Logical Memory 2 scores [\[R\]](#).

A meta-analysis of four RCTs involving 184 participants found that carnosine intervention for at least 2 weeks reduced HbA1C levels (-0.92%) but didn't significantly affect HOMA-IR, cholesterol, fasting blood sugar, or HDL-C [\[R\]](#).

45



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

Magnesium chloride could help lower HbA1c levels, which mark how well your body manages blood sugar over time. It assists in the breakdown of sugar, which may improve your overall blood sugar control.

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 [\[R\]](#).

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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) lowers HbA1c levels [\[R\]](#).

Cardamom has antioxidant and anti-inflammatory properties that can help your body respond better to insulin and lower blood sugar levels. This can be beneficial in managing HbA1c.

47



Pilates

IMPACT

2 / 5

EVIDENCE

2 / 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 [\[R\]](#), [\[R\]](#), [\[R\]](#).

Pilates may help by encouraging regular physical activity, helping to maintain a healthy weight, and improving insulin sensitivity.

48



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

Propolis (250-1,500 mg/day for 2-6 months) may help support healthy HbA1c levels [\[R\]](#), [\[R\]](#), [\[R\]](#).

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

- Reducing how much sugar is made by the body
- Increasing the removal of sugar from the blood

Please note: *Be careful with propolis if you are prone to allergies, especially if you are allergic to pollen* [\[R\]](#).

49



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

Sweet potatoes are rich in dietary fiber which helps control blood sugar levels by regulating the rate at which food is absorbed into the bloodstream. This can help manage HbA1c, a measure of long-term blood sugar control.

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 [\[R\]](#).

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Hatha Yoga

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Practice Hatha Yoga for 60 minutes at least twice a week. Choose a quiet, comfortable space and consider guided sessions for beginners or those unfamiliar with the poses. Consistency over a period of months to years is beneficial for appreciating its full effects.

TYPICAL STARTING DOSE

1 hour

Description

Hatha yoga is a gentle and accessible form of yoga that combines physical postures, breathing exercises, and meditation. Practicing hatha yoga regularly can promote flexibility, stress reduction, and overall physical and mental well-being.

How it helps

Stress has been linked to higher HbA1c and a greater risk of diabetes [\[R, R, R\]](#).

Stress hormones like cortisol contribute to insulin resistance and raise blood sugar levels [\[R, R\]](#).

Reducing stress with yoga modalities such as Hatha yoga may help lower HbA1c levels [\[R, R, R, R\]](#).

51



Whole-Body Vibration

IMPACT

2 / 5

EVIDENCE

2 / 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 ml/dl and improved various factors, primarily after 12 weeks [\[R, R\]](#).

Whole-body vibration can increase muscle strength and improve insulin sensitivity.

52



Tocotrienols

IMPACT

2 / 5

EVIDENCE

1 / 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

Tocotrienols, a type of Vitamin E, may improve blood sugar control and reduced oxidative stress in individuals with high HbA1c levels, which can indicate poor glycemic control in diabetes. Therefore, supplementing with Tocotrienols has the potential to help manage high HbA1c levels.

53



Omega-3 (Fish Oil)

IMPACT

1 / 5

EVIDENCE

3 / 5

How to implement

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

TYPICAL STARTING DOSE

2000 mg

Description

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

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

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

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

- Salmon
- Tuna
- Herring
- Sardines

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

How it helps

In patients with type 2 diabetes, supplementation with omega-3 fatty acids may reduce HbA1c levels. However, not all studies found this effect [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Moreover, omega-3s may not lower HbA1c in healthy individuals [\[R\]](#), [\[R\]](#).

Omega-3 fatty acids may improve insulin sensitivity and reduce inflammation.

54



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 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.

How to implement

Description

How it helps

Intermittent fasting may help by promoting insulin sensitivity and allowing your body to use glucose more efficiently.

How to implement

TYPICAL STARTING DOSE

100 mg

Description

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

How it helps

The findings of another meta-analysis showed that ALA supplementation among patients with metabolic diseases significantly decreased fasting glucose, insulin, homeostasis model assessment of insulin resistance, and hemoglobin A1c [R].

57



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 of healthy middle-aged and older adults, supplementation with *Lactobacillus rhamnosus* GG lowered HbA1c levels [\[R\]](#).

58



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 FBG (-9.06 mg/dl) and HbA1c (-0.19%) [\[R\]](#).

In an analysis of 25 RCTs, the mean difference in fasting blood sugar showed a significant reduction in patients with metabolic syndrome (-0.30) but a nonsignificant change in the HbA1C level [\[R\]](#).

59



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) decreased HbA1c [\[R\]](#).

Walking meditation may help by reducing stress and encouraging physical activity, both known to improve blood sugar control.

60



Glutamine

IMPACT

1 / 5

EVIDENCE

1 / 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

Glutamine is instrumental in managing HbA1c levels because it improves insulin sensitivity and aids in blood glucose control. Therefore, a glutamine supplement could decrease HbA1c levels in diabetics by improving these functions.

In a placebo-controlled trial of 13 patients with type 2 diabetes, supplementation with glutamine (15 g, 2x/day) for 4 weeks modestly decreased HbA1c and fructosamine. In another placebo-controlled trial (66 patients with type 2 diabetes), glutamine (10 g, 3x/day for 6 weeks) decreased fasting blood glucose, HbA1c, body mass, body fat, and waist circumference [\[R\]](#), [\[R\]](#).

61



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].

62



Fucoxanthin

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take fucoxanthin as a dietary supplement in a dosage of 2.4 to 8 mg per day, with a meal that contains fat for better absorption. It can be taken in a single dose or divided into two doses throughout the day. Continue for at least 5 to 16 weeks to observe benefits.

TYPICAL STARTING DOSE

3 mg

Description

Fucoxanthin is a natural pigment found in certain types of seaweed and algae. It is believed to have potential health benefits, including supporting weight management and promoting antioxidant activity.

How it helps

Fucoxanthin, a marine carotenoid, may be beneficial in reducing HbA1c levels because it has been shown to have potential antidiabetic properties. It might help enhance insulin sensitivity, which can assist in controlling high blood sugar levels that elevate HbA1c readings.

Sixty normal-weight and obese Japanese adults with BMI over 22 kg/m2 were single-blinded and randomly assigned to three Fx-dose cohorts and administered Fx-enriched akamoku oil containing Fx at 0, 1 or 2 mg/d for 8 weeks. Despite no changes in visceral fat areas and resting energy expenditures after intervention, we observed a significant decline in HbA1c levels in the 2 mg/d Fx group compared with that in the 0 mg/d group [\[R\]](#).

63



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

Eriocitrin is an antioxidant that might help lower your HbA1c, a marker of long-term blood sugar levels, by reducing inflammation and enhancing insulin sensitivity. This may result in improved blood sugar control for people with high HbA1c levels.

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 [\[R\]](#).

64



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 a [placebo-controlled trial of 120 patients with type 2 diabetes taking hypoglycemic agents](#), supplementation with okra fruit capsules (1000 mg, every 6 hours) for 8 weeks **lowered HbA1c** [\[R\]](#).

Okra contains polyphenols and flavonoids that can help control and reduce blood glucose levels. Its high fiber content also slows down sugar absorption into the blood, helping regulate blood sugar levels.

65



Artemisia Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take an artemisia extract supplement, usually available in capsule form, with a typical dosage ranging from 200 to 400 mg daily. This should be taken with water, preferably after meals to reduce the risk of stomach upset. Follow the specific dosage recommended on the product label or by a healthcare provider for up to 4 weeks.

TYPICAL STARTING DOSE

200 mg

Description

Artemisia extract is derived from various species of the Artemisia plant, and it is used in traditional medicine for its potential medicinal properties. It is being studied for its possible role in supporting digestive health and immune function.

How it helps

Supplementation with *Artemisia dracunculus* (1000 mg before breakfast and dinner) for 90 days lowered systolic blood pressure (by 7 mmHg), HbA1c (by 0.2%), AUC of insulin, and total insulin secretion, while increasing HDL cholesterol, in a placebo-controlled trial of 24 patients with impaired glucose tolerance [R].

66



Chlorella

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 3 to 5 grams of chlorella in tablet or powder form daily, ideally before meals to improve digestion. Continue this supplementation for at least 2 to 3 months to observe benefits.

TYPICAL STARTING DOSE

3 g

Description

[Chlorella](#) is a microalga from freshwater. People consume chlorella in rice, pancakes, or tea. It can also be found as a supplement [R, R].

Chlorella is **rich in protein** and several micronutrients. It may be useful to [R, R, R, R, R, R, R, R]:

- Reduce blood sugar
- Lower cholesterol
- Reduce blood pressure
- Improve immunity

How it helps

In 2 placebo-controlled trials of 146 patients with NAFLD, supplementation with chlorella (1200 mg/day), both alone and as an add-on to metformin and vitamin E, for 8 weeks lowered fasting glucose levels [R, R].

67



Restorative Yoga

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Engage in restorative yoga sessions for 20-30 minutes, at least three times a week. Choose a quiet, comfortable space where you won't be disturbed, using props such as yoga mats, bolsters, and blankets to support your body in relaxing poses.

TYPICAL STARTING DOSE

30 minutes

Description

Restorative yoga is a gentle and therapeutic form of yoga that involves holding poses for extended periods to promote relaxation, reduce stress, and improve flexibility and joint mobility.

How it helps

In a non-placebo-controlled trial of 135 patients with metabolic syndrome, practicing restorative yoga for 48 weeks decreased HbA1c, fasting glucose, and insulin [\[R\]](#).

Restorative yoga may help by reducing stress, thereby improving insulin sensitivity and promoting more efficient glucose use.

68



Magnesium Citrate

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 200-400 mg of magnesium citrate daily, preferably in the evening or before bedtime. It can be taken with or without food. If you experience any laxative effect, reduce the dosage. This supplement may be taken continuously, but it's advisable to reassess its necessity with a healthcare provider periodically.

TYPICAL STARTING DOSE

200 mg

Description

Magnesium citrate is a well-absorbed form of magnesium commonly used as a laxative to relieve occasional constipation. It can also contribute to overall magnesium intake and support digestive regularity when used as a dietary supplement.

How it helps

In a 12-week trial involving 24 individuals with metabolic syndrome, magnesium citrate (400mg/day) increased plasma magnesium, lowered blood pressure (systolic and diastolic), reduced HbA1c, and boosted serum vitamin D levels compared to placebo [\[R\]](#).

Magnesium citrate may help by enhancing insulin sensitivity.

69



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 HbA1c from 5.36 to 5.28% in those older than 50 years old [\[R\]](#).

70



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

71



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](#).

72



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

This study was designed as a randomized, double-blind, placebo-controlled trial. In all, fifty participants were randomly assigned to a placebo (n 25) or liquid ubiquinol (100 mg/d, n 25) group, and the intervention lasted for 12 weeks. After 12 weeks of supplementation, glyco Hb (HbA1c) value was significantly decreased in the liquid ubiquinol group (P=0.03) [R].

73



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

Beta-Alanine supplements can help decrease your HbA1c level by reducing the amount of glucose in your blood. This means it could potentially delay the onset of diabetes-related complications.

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].

74



lyengar Yoga

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Attend a 90-minute lyengar yoga class at least once a week. Choose a class led by a certified lyengar yoga instructor to ensure proper guidance and technique adherence.

TYPICAL STARTING DOSE

1 hour

Description

lyengar 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 lyengar yoga 2x/week for 12 weeks lowered HbA1c while improving diabetes self-care, quality of life, and emotional distress [R].

lyengar yoga may help by promoting physical activity and stress reduction. Through targeted poses and focused breathing, it can enhance insulin sensitivity.

75



Bifidobacterium Animalis Subsp. Lactis

IMPACT

1 / 5

EVIDENCE

1 / 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

Bifidobacterium Animalis Subsp. Lactis is a probiotic that may improve gut health and metabolic processes, potentially helping to lower HbA1c, a marker of long-term blood glucose control. It can support various digestive decreases associated with a high HbA1c level by promoting a healthier balance of bacteria in your gut.

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

76



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 insulin-producing pancreatic cells.

77



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 [\[R\]](#).

78



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

This diet may help by promoting cellular repair and regeneration, potentially improving insulin sensitivity and reducing the risk of diabetes complications.

79



Chamomile

IMPACT1 / 5

EVIDENCE1 / 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

Chamomile tea may help lower your HbA1c levels by slowing down carbohydrate digestion and absorption, thus reducing blood sugar levels. Additionally, its antioxidant properties can help protect pancreatic beta cells, which produce insulin, from damage.

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

80



Lactobacillus Rhamnosus GG

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

TYPICAL STARTING DOSE

10 billion CFU

Description

Lactobacillus rhamnosus GG (LGG) is a probiotic that has been shown to have a number of health benefits, including reducing the risk of diarrhea, improving gut health, and boosting the immune system. LGG can be taken as a supplement or found in some yogurts and other fermented foods.

How it helps

In a 90-day placebo-controlled trial of healthy middle-aged and older adults, supplementation with *Lactobacillus rhamnosus* GG lowered HbA1c levels [\[R\]](#).

81



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].

Sage extract may help by improving insulin sensitivity.

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].

82



Brown Seaweed And Bladderwrack

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take a brown seaweed and bladderwrack supplement according to the product's instructions, typically around 500-1000 mg daily, with meals to reduce the risk of stomach upset. It's important to check the label for specific dosage recommendations. This supplement is usually taken for periods of up to two months followed by a break or as directed by a healthcare professional.

TYPICAL STARTING DOSE

500 mg

Description

Brown seaweed, such as kelp and wakame, is a nutrient-dense marine plant 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. Bladderwrack is a type of seaweed that has been used for its potential health benefits, including iodine content that supports thyroid function.

How it helps

In a placebo-controlled trial of 65 patients with poor blood sugar control, supplementation with bladderwrack and brown seaweed extract for 6 months lowered fasting blood glucose, postprandial blood glucose, and HbA1c [\[R\]](#).

83



American Ginseng

IMPACT

1 / 5

EVIDENCE

1 / 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 a placebo-controlled trial of 24 patients with type 2 diabetes, American ginseng (3 g/day for 8 weeks) lowered HbA1c (by 0.29%), fasting glucose (by 0.71 mmol/L), and systolic blood pressure (by 5.6 mmHg), while increasing nitrates/nitrites and the HDL:LDL ratio [\[R\]](#).

American ginseng and konjac fiber taken for 12 weeks reduced HbA1c, LDL-cholesterol, non-HDL cholesterol, total cholesterol, total cholesterol:HDL ratio, ApoB, and ApoB:ApoA1 ratio in a placebo-controlled trial of 30 patients with type 2 diabetes [\[R\]](#).

American Ginseng may improve glycemic control and support healthy blood sugar levels.

84



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

Glycine can improve the body's control over blood sugar levels, helping reduce HbA1c criteria, a measure of long-term blood glucose control. This benefits those with diabetes or at risk for diabetes.

Supplementation with glycine (5 g/day) for 3 months lowered HbA1c in a placebo-controlled trial of 74 patients with type 2 diabetes [\[R\]](#).

85



Laughter Yoga

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Attend a laughter yoga session for at least 30 minutes, three times a week. These sessions can be found in local community centers or online classes tailored for various ages and physical abilities.

TYPICAL STARTING DOSE

30 minutes

Description

Laughter yoga combines laughter exercises and deep breathing to promote mental and emotional well-being. It is believed to reduce stress, improve mood, and boost overall mental health.

How it helps

In a non-placebo-controlled trial of 42 patients with type 2 diabetes, practicing laughter yoga for 12 weeks decreased HbA1c by 0.31% [\[R\]](#).

Laughter yoga can help by reducing stress, which, in turn, aids in controlling blood sugar.

86



Diaphragmatic Breathing

IMPACT

1 / 5

EVIDENCE

1 / 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

Diaphragmatic breathing reduces stress, which can assist in lowering blood glucose levels, thereby helping to reduce HbA1c rates. Lower stress levels can improve your body's insulin sensitivity and promote better blood sugar control.

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

87



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

Black Chokeberry contains compounds that can lower blood sugar levels, which helps reduce HbA1c. Since HbA1c is a marker that measures average blood sugar over three months, a lower HbA1c indicates better control over diabetes.

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

88



Fucoidan

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 300 mg of fucoidan supplement once daily, preferably with a meal to aid absorption. Continue this regimen for a minimum of four weeks to evaluate its effects on your health.

TYPICAL STARTING DOSE

300 mg

Description

Fucoidan is a compound found in certain brown seaweeds and marine plants, and it is consumed for its immune system support and anti-inflammatory effects.

How it helps

In a placebo-controlled trial of 42 patients with NAFLD, supplementation with low-molecular-weight fucoidan and high-stability fucoxanthin (275 mg LMF and 275 mg HSFx, 3x/day) for 24 weeks reduced liver fibrosis and steatosis, AST, ALT, total cholesterol, triglycerides, fasting glucose, HbA1c, IL-6, and IFN-gamma [\[R\]](#).

Fucoidan may enhance insulin sensitivity and reduce blood sugar levels, thus lowering HbA1c.

89



Biotin

IMPACT

1 / 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), in 4 placebo-controlled trials of 874 patients with type 2 diabetes [\[R, R, R, R\]](#).

Biotin may enhance the action of insulin, supporting better blood sugar regulation.

90



Rutin

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 500mg of rutin supplement daily, preferably with a meal to enhance absorption. Continue this supplementation regularly for at least 4 weeks to evaluate its benefits on your health, as effects may take some time to become noticeable.

Description

Rutin is a flavonoid found primarily in citrus fruits, buckwheat, and tea, and is known for its antioxidant and anti-inflammatory properties. It may support cardiovascular health and promote strong blood vessels.

How it helps

A double-blind, placebo-controlled trial with 50 type 2 diabetes mellitus patients found that rutin (500 mg/day for 3 months) decreased fasting blood glucose, insulin, HbA1c, HOMO-IR, LDL-c, TG, VLDL, total cholesterol, LDL-c:HDL-c ratio, atherogenic index of plasma (AIP), IL-6, and malondialdehyde (MDA), while increasing HDL-c, quantitative insulin sensitivity check index (QUICKI), BDNF, and total antioxidant capacity (TAC). Hence rutin may improve metabolic parameters, BDNF, and inflammatory and oxidative stress factors in T2DM patients [\[R\]](#).

In a prospective, randomized, controlled study conducted on 53 type 2 diabetes patients. rutin with vitamin C and vitamin C only reduced fasting blood glucose and LDL- and total cholesterol [\[R\]](#).

Rutin may help your body use insulin more efficiently, which in turn helps to regulate blood sugar levels.

Please note: *rutin 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 rutin and always consult with a healthcare provider before taking this supplement* [\[R\]](#).

91



Akkermansia

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take Akkermansia muciniphila as a supplement in capsule form, usually one capsule per day. It is best consumed with a glass of water, preferably in the morning. Follow this routine for a duration as advised by a healthcare provider, but commonly for a period of at least 8 to 12 weeks to observe potential benefits.

Description

Akkermansia is a type of gut bacteria that resides in the human digestive system. It has been studied for its potential role in gut health and its association with metabolic and immune functions.

How it helps

In a placebo-controlled trial of 32 overweight or obese participants with insulin resistance, supplementation with *Akkermansia muciniphila* (10^10 cfu/day) for 3 months reduced insulin levels [\[R\]](#).

A synbiotic with inulin, *Akkermansia muciniphila*, *Clostridium beijerinckii*, *Clostridium butyricum*, *Bifidobacterium infantis*, and *Anaerobutyricum hallii* improved HbA1c in a 12-week placebo-controlled trial of 76 patients with type 2 diabetes [\[R\]](#).

Akkermansia may enhance the body's metabolic activities and regulate blood sugar levels. Thus, taking it as a supplement could potentially decrease HbA1c levels.

92



Maintain Optimal Vitamin D Levels

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

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

TYPICAL STARTING DOSE

1000 iu

Description

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

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

- Mood
- Immunity
- Heart health
- Blood sugar control

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

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

How it helps

Vitamin D administration significantly decreased both fasting blood sugar and HbA1c levels in a study of children and adolescents with type 1 diabetes, without affecting calcium and alkaline phosphatase levels [\[R\]](#).

Similarly, the long-term maintenance of adequate vitamin D levels significantly lowered HbA1c in African American patients with type 2 diabetes [\[R\]](#).

However, a randomized controlled trial involving healthy immigrants found no significant change in HbA1c after 16 weeks of vitamin D3 supplementation [\[R\]](#).

93



Whey Protein

IMPACT

0 / 5

EVIDENCE

0 / 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

Whey protein may help lower HbA1c levels in people with diabetes by promoting insulin production and slowing glucose absorption. However, everyone's response to supplements differs and should be monitored closely by a healthcare professional.

94



Limit Calorie Intake

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

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

Description

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

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

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

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

How it helps

Limiting calorie intake can help control HbA1c levels, a measure of your average blood sugar over the past three months, by reducing the amount of sugar that enters your bloodstream. Less sugar intake means less work for your insulin, improving overall diabetes management.

95



Dietary Vitamin E

IMPACT

0 / 5

EVIDENCE

0 / 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

Dietary Vitamin E can aid in the management of HbA1c (an indicator of blood sugar control) because it has antioxidant properties that help combat damage caused by high blood sugar levels. By reducing oxidative stress, it can potentially lower HbA1c levels, thus improving glucose control.

Please note: *While dietary vitamin E is generally considered safe, vitamin E supplements have been linked to prostate cancer. They may also not be the best option for pregnant people. Those who have heart disease, bleeding disorders, or other conditions may also need to avoid them. Consult your doctor before taking vitamin E supplements* [\[R\]](#).

96



Whole-Grain Rice

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate whole-grain rice into your meals, aiming for at least half of your grain intake to be whole grains. You can do this by replacing white rice with whole-grain varieties like brown rice, black rice, or wild rice in your dishes. Try to include whole-grain rice in at least one meal per day, whether it's as a side dish or part of a main course.

Description

Whole grain rice is rice that has retained its outer bran layer, germ, and endosperm, providing more nutrients and fiber compared to refined white rice. It contains vitamins, minerals, antioxidants, and dietary fiber, promoting better digestion, heart health, and blood sugar control. Consuming whole-grain rice regularly can contribute to a balanced diet and reduce the risk of chronic diseases such as diabetes, heart disease, and certain cancers.

How it helps

Whole grains like brown rice have more fiber than white rice, which can help in maintaining steady blood sugar levels.

97



Avocado

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate half to one whole avocado into your daily diet. You can add it to salads, sandwiches, or use it as a healthy fat substitute for spreads or dressings.

Description

Avocado is a nutrient-dense fruit known for its creamy texture and healthy monounsaturated fats. It is packed with vitamins, minerals, and dietary fiber, and may support heart health, skin health, and overall nutrition.

[Avocado](#) is a fruit first cultivated in Mexico in 500 BCE [\[R\]](#), [\[R\]](#).

You can eat it raw in salads, sandwiches, and dips. Avocado oil has recently become popular, but it’s much less nutritious than the whole fruit.

Avocado is rich in antioxidants, vitamins, minerals, and fiber. It may support [\[R\]](#):

- Heart health
- Healthy weight
- Healthy aging

How it helps

Avocados contain monounsaturated fats that can improve insulin sensitivity, an important factor in blood sugar control.

98



Blueberries

IMPACT

0 / 5

EVIDENCE

0 / 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

Blueberries have antioxidants known as anthocyanins, which can enhance insulin sensitivity and lower blood sugar levels.

99



Beta-Glucans

IMPACT

0 / 5

EVIDENCE

0 / 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

Beta-Glucans, a type of soluble fiber, slows down food digestion and reduces the sudden rise in blood sugar after meals, which can benefit HbA1c control. Long-term intake might play a preventive role in HbA1c by improving insulin resistance.

100



Avoid Rapid Weight Changes

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Maintain a consistent, healthy weight by avoiding extreme dieting or sudden increases in food intake. Aim for gradual weight changes, not exceeding 1-2 pounds per week, by adjusting your diet and physical activity levels accordingly. This approach should be sustained over a long-term period to ensure health and prevent potential adverse effects on the body.

Description

Avoiding extreme and rapid weight changes, whether through crash diets or excessive calorie restriction, is essential for preventing negative health consequences such as nutritional deficiencies and metabolic disruptions.

Your weight is determined by the number of calories you consume compared to those you burn. Changes in exercise frequency, amount and type of food consumed, and alcohol intake may alter your energy expenditure. This may cause small weight fluctuations [\[R\]](#).

Some people may gain or lose weight at a faster rate. Rapid weight fluctuations may be due to [\[R\]](#), [\[R\]](#):

- Very drastic diets
- Water retention or dehydration
- Hormonal changes
- Pregnancy
- Taking certain medications
- Certain health conditions

How it helps

Maintaining a stable weight helps regulate blood sugar levels, which can positively influence HbA1c.

101



Brown Seaweed

IMPACT

0 / 5

EVIDENCE

0 / 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 65 patients with poor blood sugar control, supplementation with bladderwrack and brown seaweed extract for 6 months lowered fasting blood glucose, postprandial blood glucose, and HbA1c [\[R\]](#).

102



Oat Bran

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate oat bran into your diet by adding 1-2 tablespoons to your breakfast cereal or yogurt daily. You can also use it as an ingredient in homemade bread, muffins, or pancakes. Aim to include oat bran in at least one meal per day for ongoing dietary benefits.

Description

Oat bran is the outer layer of oat grains and is rich in soluble fiber, making it a heart-healthy addition to diets. Consuming oat bran may help lower cholesterol levels and support digestive regularity.

How it helps

Oat bran is high in soluble fiber, which can regulate blood sugar levels by slowing carbohydrate absorption.

103



Ivy Gourd

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take an ivy gourd supplement of 300-500 mg daily with water, preferably with meals to enhance absorption. Continue this regimen for at least 6 to 8 weeks to observe potential benefits.

TYPICAL STARTING DOSE

300 mg

Description

Ivy gourd is a vegetable known for its potential to support blood sugar control. It contains compounds that may help regulate glucose metabolism and contribute to overall metabolic health.

How it helps

Ivy Gourd may benefit those with high HbA1c levels as it contains properties that can help reduce blood sugar levels, potentially leading to a decrease in your HbA1c. Be aware it's not a treatment, but it might help when used along with regular treatment for diabetes.

104



Inulin

IMPACT

0 / 5

EVIDENCE

0 / 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

Inulin, a type of dietary fiber found in plants, can help lower HbA1c levels as it slows digestion and aids in controlling blood sugar levels. It also fuels beneficial gut bacteria, aiding overall digestion and metabolic health.

105

Mindfulness

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

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

TYPICAL STARTING DOSE

30 minutes

Description

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

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

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

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

How it helps

Mindfulness reduces stress and promotes healthier lifestyles, which helps control blood sugar levels, thereby lowering HbA1c, a significant marker for long-term blood glucose control. Consistent practice can improve dietary habits and encourage regular exercise, vital components in managing diabetes.

106



Salacia

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take a salacia supplement with a dosage of 240-480 mg per day before meals. It is typically advised to start with the lower end of the dosage range and adjust according to tolerance and effectiveness. Continue this regimen daily for at least 4-6 weeks to evaluate its effects on blood sugar levels and insulin resistance.

TYPICAL STARTING DOSE

240 mg

Description

Salacia is a plant native to India and Sri Lanka, known for its traditional use in Ayurvedic medicine to help support healthy blood sugar levels. Its main active compounds are salacinol and mangiferin.

How it helps

Salacia is a plant that has properties to lower blood sugar levels. In people with high HbA1c, a measure of long-term blood sugar control, it can help reduce these levels and improve their condition.

107



Moringa

IMPACT

0 / 5

EVIDENCE

0 / 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 is high in antioxidants and bioactive plant compounds, which can help lower blood sugar levels, thus improving HbA1c readings for individuals with diabetes. It may provide a complement to your existing diabetes treatments, but should not replace your doctor's regimen.

108



Caper Fruit Extract

IMPACT

0 / 5

EVIDENCE

0 / 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

Caper Fruit Extract can help reduce levels of HbA1c, which stands for glycated hemoglobin and is used to measure blood sugar control in people with diabetes. It does this by mimicking the actions of insulin, helping your body to more effectively use its own insulin and lowering blood sugar levels.

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Allulose

IMPACT

0 / 5

EVIDENCE

0 / 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

Allulose may have an effect on blood glucose levels due to its insulin-influencing properties.

110



Yerba Mate

IMPACT

0 / 5

EVIDENCE

0 / 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

Yerba Mate can potentially help lower HbA1c levels, as it has been shown in some studies to aid in blood sugar regulation. This could be beneficial for those with diabetes or prediabetic conditions as lowering HbA1c levels indicates better long-term blood sugar control.

111



Apple Cider Vinegar

IMPACT

0 / 5

EVIDENCE

0 / 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

Apple cider vinegar can help lower HbA1c levels, a measure of long-term blood sugar control, by slowing the digestion of carbohydrates, which reduces the rise in blood sugar after meals. However, it's not a replacement for diabetes medication and you should consult with your doctor for an appropriate treatment plan.

112



Whole Grains

IMPACT

0 / 5

EVIDENCE

0 / 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

Eating whole grains helps regulate blood sugar levels, reducing the risk of high HbA1c, a measure of long-term blood sugar control. High fiber content in whole grains slows down the absorption of sugar into your bloodstream and prevents sudden spikes, promoting better diabetes management.

113



Aquatic Exercise

IMPACT

0 / 5

EVIDENCE

0 / 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

Aquatic exercise can help improve insulin sensitivity and glycemic control, potentially reducing HbA1c levels.

114



Meditation

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

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

TYPICAL STARTING DOSE

30 minutes

Description

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

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

- Mindfulness
- Focused
- Transcendental
- Mantra
- Moving

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

- Stress and anxiety
- Mood
- Sleep disturbances
- Pain

How it helps

Meditation helps manage HbA1c levels, which indicate long-term blood glucose control, by reducing stress and promoting a better lifestyle which in turn can improve insulin sensitivity and decrease inflammation. Thus, regular practice can help maintain adequate blood sugar levels and manage symptoms in diabetes patients.

115



Oats

IMPACT

0 / 5

EVIDENCE

0 / 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

Oats contain high amounts of fiber which slows the absorption of sugars into the bloodstream, helping to control blood glucose levels. This can help in managing HbA1c levels, a measure of long-term blood sugar control, and preventing its rise.

116



Broccoli

IMPACT

0 / 5

EVIDENCE

0 / 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

Broccoli contains sulforaphane, which may improve insulin sensitivity and help with blood sugar control.

117



Green Tea Extract

IMPACT

0 / 5

EVIDENCE

0 / 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

Green Tea Extract may help in glucose metabolism and improve insulin sensitivity.

118



Brazil Nuts

IMPACT

0 / 5

EVIDENCE

0 / 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 [\[R\]](#).

119



Paleo Diet

IMPACT

0 / 5

EVIDENCE

0 / 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

The Paleo Diet, which eliminates sugars and processed foods, can help lower HbA1c levels, a marker of long-term blood sugar control. This can be beneficial for people with diabetes or pre-diabetes, as it promotes better blood sugar management.

120



Bladderwrack

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 300-500 mg of bladderwrack supplement daily, preferably with meals to enhance absorption. It's recommended to start with the lower dose and gradually increase if needed. Consult with a healthcare provider before beginning, especially if you are pregnant, nursing, or have a medical condition like hyperthyroidism.

TYPICAL STARTING DOSE

300 mg

Description

Bladderwrack is a type of seaweed that has been used for its potential health benefits, including iodine content that supports thyroid function.

How it helps

In a placebo-controlled trial of 65 patients with poor blood sugar control, supplementation with bladderwrack and brown seaweed extract for 6 months lowered HbA1c and blood glucose [\[R\]](#).

Bladderwrack is rich in iodine. This can help stimulate the thyroid gland, which can improve metabolism and potentially manage HbA1c levels in people with diabetes.

121



Cognitive-Behavioral Therapy (CBT)

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Schedule weekly sessions with a certified cognitive-behavioral therapist for a period of 5 to 20 weeks. Engage actively in exercises assigned by your therapist both during sessions and as homework to apply CBT strategies to daily life.

Description

Cognitive-behavioral therapy (CBT) is a psychotherapeutic approach that has been effective in treating various mental health conditions by helping individuals identify and change negative thought patterns and behaviors. It is widely used for conditions like depression, anxiety, and phobias.

Psychotherapy (talk therapy) involves talking about your health with a licensed therapist. It may improve the way you react to certain experiences [\[R\]](#).

Talk therapy is a great way to improve many conditions, including [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Depression
- Anxiety disorders
- PTSD
- OCD
- Substance use disorder
- Bipolar disorder

Cognitive-behavioral therapy (CBT) is a type of talk therapy. CBT aims to change the way you think about your life and yourself. Through CBT, a therapist can help you develop healthy coping mechanisms [\[R\]](#).

How it helps

CBT can help manage HbA1c levels in people with diabetes by aiding in the adoption of healthier behaviors and coping strategies to deal with stress and anxiety related to their condition. It can improve adherence to medication, diet and physical activity, which control blood sugar levels.

122



Green Jackfruit Flour

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate green jackfruit flour into your daily diet by substituting approximately 30 grams (around one ounce) of your usual flour with green jackfruit flour when cooking or baking. This can be done daily as a part of your regular meal preparation.

Description

Green jackfruit flour is a gluten-free and nutritious alternative to wheat flour, rich in dietary fiber, vitamins, and minerals. Incorporating it into recipes can support digestive health, improve blood sugar control, and promote overall nutritional wellness.

How it helps

Incorporating Green Jackfruit Flour into your diet can improve your HbA1c levels as it contains fiber and low glycemic index, which help regulate blood sugar levels. By doing this, you can better manage diabetes, a condition associated with high HbA1c levels.

123



Chromium

IMPACT

0 / 5

EVIDENCE

0 / 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

Chromium supplementation has been found to enhance insulin activity and improve glucose metabolism.

124



Practice Exercise Snacks

IMPACT

0 / 5

EVIDENCE

0 / 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

Physical activity is key in managing blood glucose levels, and thus can influence HbA1c.

125



Mindfulness-Based Stress Reduction (MBSR)

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

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

TYPICAL STARTING DOSE

2 hours

Description

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

How it helps

MBSR may reduce stress and improve blood sugar control, potentially affecting HbA1c.

126



Legumes

IMPACT

0 / 5

EVIDENCE

0 / 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

Legumes are high in fiber and protein, which helps to control blood sugar levels, thereby improving your HbA1c readings. Regular consumption can reduce the risk of developing high HbA1c levels, which indicate long-term glucose management issues.

127



Fenugreek

IMPACT

0 / 5

EVIDENCE

0 / 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

Fenugreek, packed with fiber and other beneficial compounds, slows down the absorption of sugars in the stomach which helps in regulating blood sugars. This can assist in managing HbA1c levels, that indicate long-term glucose control, potentially preventing conditions like diabetes.

128



Spinach

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate one cup of fresh spinach or half a cup of cooked spinach into your daily diet. You can add spinach to salads, smoothies, omelets, or pastas to easily increase your intake.

Description

Spinach is a leafy green vegetable packed with essential nutrients, including vitamins A and K, iron, and folate. Incorporating spinach into the diet supports eye health, bone health, and overall nutrition.

Spinach is a good source of molybdenum, folate, calcium, and iron, as well as vitamins A, C, and K1. A ½ cup serving provides 8 mcg of molybdenum or 18%DV.

How it helps

Leafy greens like spinach are low in carbohydrates and high in magnesium, which can help manage blood sugar levels.

129



Almonds

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate a handful of almonds (about 23 kernels) into your daily diet. You can eat them as a snack, add them to your breakfast cereals or yogurt, or include them in salads and other dishes. Do this consistently for ongoing health benefits.

Description

Almonds are a good source of omega-6s, protein and vitamins, making for a great snack food. A 1-ounce serving provides 3700 mg of omega-6.

Almonds are nutritious tree nuts that originate from the *Prunus dulcis* tree. They are packed with essential nutrients, including healthy fats, fiber, vitamin E, and magnesium, which collectively contribute to heart health, support weight management, and may help regulate blood sugar levels.

How it helps

Almonds are rich in magnesium, a mineral that may improve insulin sensitivity and help lower blood sugar levels.

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.

