

Vitamin K Protects Against Diabetes

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✓ Fact Checked

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STORY AT-A-GLANCE

- › Canadian researchers identified a protective role vitamin K plays against diabetes following past research implicating vitamin K in the development of the disease. Diabetes was the seventh leading cause of death in 2017 and total health care costs were \$327 billion in 2019
- › The researchers found vitamin K in large quantities in beta cells where insulin is produced and discovered it plays an important role in maintaining calcium, which prevents a disturbance in insulin secretion
- › Vitamin K is a fat-soluble vitamin and important to lowering the inflammatory response, bone metabolism, preventing mineralization of the arterial system, and preventing heart attack, stroke, peripheral vascular disease and cancer
- › Other important factors in the development of diabetes include carbohydrate intake, artificial sweeteners, seed oils and statin medications. Addressing these factors as well as increasing omega-3 fat consumption and ensuring you are not deficient in vitamin C and magnesium can also help prevent diabetes

In a May 2023 paper, Canadian researchers announced they had newly identified a protective role that vitamin K plays against diabetes.¹ In 2019, diabetes was the seventh leading cause of death in the U.S.,² a disease which affected approximately 37.3 million people in 2019.³

How Diabetes Affects Public Health

According to the CDC,⁴ the total number of existing cases of diabetes steadily increased from 2001 to 2020 and similar trends were seen when the population was examined by ethnic group, education level, race, age and sex. The CDC further broke down the data by the percentage of adults with diagnosed diabetes in each state.

When this table is compared against 2021 data of obese adults,⁵ it is apparent that many of the states with higher numbers of obese adults also have higher percentages of adults with diagnosed diabetes.

In 2017,⁶ it was estimated the total health care cost for people diagnosed with diabetes was \$327 billion. The total direct cost in 2017 was \$237 billion, which rose dramatically from \$188 billion in 2012. In 2018 diabetes was responsible for 8.25 million hospital discharges, 17 million emergency room visits and 62,012 people with end-stage kidney disease.

One of the hallmark signs of diabetes is high blood sugar, which happens for several reasons. For example, the pancreas may not make enough insulin, which is the hormone that helps glucose move from the bloodstream into the cells to be used for energy. The cells may also become insulin resistant, a significant risk factor for which is **overeating carbohydrates** and added sugars. These spike your insulin level and gradually increase resistance.

Sugar and carbohydrate can cause a hormonal response, which changes metabolism and is a primary cause of weight gain.^{7,8} In essence, this data supports the statement that you cannot out-exercise your diet and therefore your risk for Type 2 diabetes. According to the CDC,⁹ the daily mean percentage of carbohydrate intake for men and women is 45.9% and 47.4% respectively.

The current Dietary Guidelines for Americans, 2020-2025, lists the upper limit for carbohydrates at 65%,¹⁰ although the limits were based on nearly 20-year-old data. According to the 2020 guidelines, the "Estimates are based on Estimated Energy Requirements (EER) set by the Institute of Medicine. Source ... 2005."

Vitamin K and Gamma Carboxylation Protects Insulin Production

Scientists know that vitamin K is necessary for gamma-carboxylation of glutamic acids that occurs in the cells and affects protein secretion.¹¹ Past clinical studies have also implicated vitamin K in the development of diabetes, yet the underlying mechanism has remained unclear.

Vitamin K is best known for the role it plays in blood clotting. The gamma-carboxylation reaction is essential to the process of blood clotting and scientists have suspected this process may also have other functions in the body.¹² Past studies show a link between a lower intake of vitamin K and an increased risk of Type 2 diabetes.

Researchers from the University of Montreal first determined that vitamin K was present in large quantities in beta cells — where insulin is produced — and involved in gamma-carboxylation. Then, using an animal model, they identified the role vitamin K plays in the gamma-carboxylation inside the beta cells and how the presence of vitamin K may help protect against diabetes. Julie Lacombe conducted the laboratory work and commented in a press release:¹³

"We were able to identify a new gamma-carboxylated protein called ERGP. Our study shows that this protein plays an important role in maintaining physiological levels of calcium in beta cells in order to prevent a disturbance of insulin secretion. Finally, we show that vitamin K through gamma-carboxylation is essential for ERGP to perform its role."

The researchers point out that this is the first time in 15 years a new vitamin K-dependent protein has been identified. This potentially opens a new area of research in the role vitamin K plays in the body, as well as new therapeutic applications for diabetes.

More Health Benefits From Vitamin K

Vitamin K is a fat-soluble vitamin that significantly influences your health.¹⁴ Since your body stores very little, it's rapidly depleted without regular dietary intake. Several

common drugs can also deplete levels of vitamin K, which makes ensuring adequate consumption even more important.

Vitamin K is involved in several bodily functions, including bone metabolism and preventing blood vessel mineralization. This means it plays a particularly important role in the prevention of osteoporosis, heart disease and bleeding disorders.

There are two main forms of vitamin K and several subtypes, which can make matters a little confusing. The difference between vitamins K1 and K2 was clearly established in the 2004 Rotterdam study,¹⁵ which focused on the effect the vitamins had on heart health. While vitamin K1 has no real effect on heart disease, vitamin K2 is important to the cardiovascular system.

Vitamin K1 plays other roles. In a 2020 study,¹⁶ researchers found older individuals with low levels of vitamin K1 had a higher probability of mobility issues and disability than those with higher levels. One of the reasons vitamin K2 plays an important role in bone and heart health has to do with complex biochemical reactions involving the enzymes matrix gla-protein and osteocalcin.

"Gla" stands for glutamic acid, which binds to calcium in the cells of the arterial walls and removes it from the lining of your blood vessels.¹⁷ It then helps facilitate the integration of calcium into the bone matrix.

Calcium deposits in the arteries are responsible for atherosclerosis, commonly called hardening of the arteries, which slowly blocks blood flow. This is a common cause of heart attacks, strokes and peripheral vascular disease. Vitamin K2 also helps move calcium into tooth enamel and plays a role in preventing tooth decay.¹⁸

Vitamin K2 plays a role in cancer prevention, as noted in the 2010 European Prospective Investigation into Cancer and Nutrition study.¹⁹ People with higher intakes of vitamin K2 also had lower cancer risk and mortality. Evidence has also suggested²⁰ that vitamin K2 can reduce the risk of Non-Hodgkin lymphoma by 45% as compared to those with the lowest intake of vitamin K2. The researchers attribute this role to the vitamin's ability to inhibit inflammatory cytokines.

The inflammatory response is crucial in many chronic diseases and diseases of aging, and research has suggested both vitamin K1 and K2 have anti-inflammatory properties. In one analysis,²¹ researchers found vitamin K helps protect against chronic aging conditions, cardiovascular disease and inflammation.

Another study²² demonstrated a reduction in C-reactive protein, a common biomarker used to evaluate inflammation in patients with rheumatoid arthritis. Vitamin K2 may also play a role in chronic kidney disease. One clinical trial²³ demonstrated four weeks of supplementation with vitamin K2 MK-7 significantly reduced calcification in the participants' blood vessels.

Vitamin K2 MK-7 has also demonstrated benefits in participants with age-related macular degeneration.²⁴ In a 2012 paper,²⁵ researchers revealed the role vitamin K2 serves as a mitochondrial electron carrier, which helps maintain normal ATP production in mitochondrial dysfunction like that found in Parkinson's disease.

Multiple Factors Contribute to Diabetes

There were an estimated 96 million adults diagnosed with prediabetes in 2019. However, this may only be a matter of semantics as many are suffering from what the late Dr. Joseph Kraft calls "diabetes in situ."²⁶ I believe any fasting blood sugar that regularly measures over 90 suggests insulin resistance and Kraft suggested 8 out of 10 Americans were insulin resistant based on data from 14,384 patients.

The risks of prediabetes include being overweight and inactivity.²⁷ One factor that significantly increases your risk of obesity, and therefore Type 2 diabetes, is artificial sweeteners. A 2018 animal study²⁸ confirmed that artificial sweeteners raise your risk of obesity and diabetes.

Other studies²⁹ have demonstrated that women who consume artificial sweeteners feel hungrier and consume more food than those who drink sugar-sweetened beverages. This research showed³⁰ the body is not fooled by artificial sweeteners, which is another reason why they promote, rather than prevent, obesity.

During the COVID-19 pandemic, there was a 17% rise in deaths in people with diabetes.³¹ During the pandemic, 39.5% of all deaths related to COVID occurred in those with diabetes.³² Inactivity and a poor diet fueled the diabetic crisis during the pandemic. Diets that focus on ultraprocessed foods and fast foods are at the root of the problem as they are loaded with dangerous seed oils, misleadingly named "vegetable oils."

Yet, the American Diabetes Association continues to recommend seed oils like canola "as part of a healthy balanced diet."³³ These oils are rich in **omega-6 linoleic acid**, which is the most common fat in the American diet. An important take-home message is that linoleic acid is not digested. Instead, it is stored while saturated fat is mostly burned or oxidized and used up.³⁴ This aptly illustrates the importance of the type of fat you eat.

Secondary effects from some medications can also increase the risk of developing diabetes. One of the most significant of those medications is statins. These are cholesterol-lowering medications with a long history of adverse events and side effects that could double the risk of diabetes with long-term use.³⁵

Ensuring your bedroom is pitch black is a simple way to reduce your risk of chronic disease. A real-world study³⁶ in individuals aged 63 to 84 found those who were exposed to light during sleep were more likely to be obese and have high blood pressure or diabetes.

Strategies to Reduce Your Risk or Reverse High Blood Sugar

Eating a balanced, healthy diet of fresh, organically raised fruits and vegetables and steering clear of artificial sweeteners and all processed foods is the best way to take control of your glucose levels. The timing of your meals also matters.

Time-restricted eating (TRE) is a simple yet powerful intervention for weight loss. TRE mimics the eating habits of our ancestors and restores your body to a more natural state that allows a host of metabolic benefits to occur.³⁷ If you're overweight or obese, I recommend limiting your eating window to six to eight hours per day instead of the more than 12-hour window most people use.

As mentioned, one of the most important strategies to reduce your risk for diabetes or reverse the disease is to reduce your LA intake. Many people will experience weight loss as a "side effect" of reducing intake of LA. Ideally, consider cutting LA down to below 7 grams per day, which is close to what our ancestors used to get before all of these chronic health conditions, including obesity, diabetes, heart disease and cancer, became widespread.

To do so, you'll need to avoid nearly all ultraprocessed foods, fast foods and restaurant foods, as virtually all of them contain seed oils. The easiest way to do this is to prepare the majority of your food at home so you know what you are eating.

Also, be aware that, because animals are fed grains that are high in linoleic acid,³⁸ it's also hidden in "healthy" foods like chicken and pork, which makes these meats a major source that should be avoided. Olive oil is another health food that can be a hidden source of linoleic acid, as it's often cut with cheaper seed oils. Instead, use tallow, ghee or butter to cook with. Ghee is better than butter as it has a higher smoke point.

Still Other Strategies

Several other strategies can also help improve blood sugar control and protect your overall health. One is to pay attention to the type of fat in your diet.

While omega-6 linoleic acid primarily found in vegetable/seed oils, nuts and seeds are damaging in the amounts consumed by Americans, most people don't get enough omega-3 fatty acids. Omega-3 fats are found in fatty, cold-water fish such as wild-caught Alaskan salmon, anchovies, sardines, mackerel and herring.

It's best to avoid farmed salmon as there is an exaggerated potential for contamination, including pollution, disease, toxicity and inferior nutritional quality. Most farmed fish are also fed genetically engineered corn and soy, which is a completely unnatural diet for marine life and loaded with hazardous omega-6 fat that is stored in the flesh, raising the consumers' intake of omega-6 fat.

A December 2020 study³⁹ showed adults who test positive for glutamic acid decarboxylase (GAD65) antibodies can significantly reduce the risk of adult-onset Type 1 diabetes by eating omega-3-rich fatty fish. Type 1 diabetes is an autoimmune condition and the researchers found that those who did not eat fatty fish were twice as likely to develop the disease.⁴⁰

Other nutrient deficiencies associated with the development of diabetes include vitamin C, vitamin D and magnesium. With vitamin C, one study showed that supplementation may help lower glucose levels.⁴¹ Likewise, other studies show that vitamin D supplementation can be an ally against diabetes.⁴²

Magnesium is also an often-overlooked nutrient. Deficiency is associated with Type 2 diabetes and heart disease⁴³ and low levels may be the greatest predictor of heart disease.⁴⁴ Magnesium deficiency is linked to a higher risk of insulin resistance since it impairs the body's ability to regulate blood sugar.⁴⁵

In one study⁴⁶ of prediabetics, those with the highest magnesium intake lowered their risk for blood sugar and metabolic problems by 71% when compared to those with the lowest intake. To compound the problem, high serum levels of insulin, which is common in insulin resistance, lead to further magnesium loss.⁴⁷

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