



Diabetes and Dietary Supplements



© Matthew Lester

Diabetes is a group of chronic diseases that affect metabolism—the way the body uses food for energy and growth. Millions of people have diabetes, which can lead to serious health problems if it is not managed well. Conventional medical treatments and following a healthy lifestyle, including watching your weight, can help you prevent, manage, and control many complications of diabetes. Researchers are studying several complementary health approaches, including dietary supplements, to see if they can help people manage type 2 diabetes—the focus of this fact sheet—or lower their risk of developing the disease.

Key Facts

A healthy diet, physical activity, and blood glucose testing are the basic tools for managing type 2 diabetes. Your health care providers will help you learn to manage your diabetes and track how well you are controlling it. It is very important **not** to replace proven conventional medical treatment for diabetes with an unproven health product or practice.

Are dietary supplements for diabetes safe?

Some dietary supplements may have side effects, including interacting with your diabetes treatment or increasing your risk of kidney problems.

Are any dietary supplements for diabetes effective?

There is not enough scientific evidence to suggest that any dietary supplements can help prevent or manage type 2 diabetes.

Keep in Mind

Tell all your health care providers about any complementary health approaches you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

About Diabetes

There are three different types of diabetes—type 1, type 2, and gestational. All three types of diabetes involve problems with how our bodies respond to the hormone insulin. Most of the food we eat is broken down into glucose, a type of sugar and the main fuel

Diabetes and Dietary Supplements

for our bodies. To use glucose, our bodies need insulin. People with type 1 diabetes produce little or no insulin. People with type 2 diabetes do not respond normally to the insulin their bodies make. About 90 to 95 percent of people diagnosed with diabetes have type 2 diabetes. Only about 5 percent have type 1 diabetes, which is usually diagnosed in childhood or early adulthood and requires treatment with insulin. Gestational diabetes affects only pregnant women. It usually goes away after the birth, but it increases the risk of the mother developing diabetes later in life. For more information about diabetes and related conditions, see the National Diabetes Information Clearinghouse Web site at <http://diabetes.niddk.nih.gov/index.aspx>.

What the Science Says

Overall, there is not enough scientific evidence to show that any dietary supplement can help manage or prevent type 2 diabetes. This fact sheet addresses some of the many supplements studied for diabetes, with a focus on those that have undergone clinical trials (studies in people).

Side Effects and Risks

There are multiple case reports linking dietary supplement use to kidney disease, which is of particular concern because diabetes is the leading cause of chronic kidney disease and kidney failure in the United States. Supplement use should be monitored closely in patients who have or are at risk for kidney disease. For safety warnings for individual supplements, see below.

Alpha-Lipoic Acid

Alpha-lipoic acid is an antioxidant (a substance that may protect against cell damage). Studies have examined the effects of alpha-lipoic acid supplements on complications of diabetes. For example:

- A 2011 clinical trial of 467 participants with type 2 diabetes found that supplements of 600 milligrams of alpha-lipoic acid daily did not prevent diabetic macular edema, an eye condition that causes blurred vision.
- Alpha-lipoic acid and vitamin E supplements taken separately or in combination did not improve cholesterol levels or the body's response to insulin in a 2011 clinical trial of 102 people with type 2 diabetes.

Safety

High doses of alpha-lipoic acid supplements can cause gastrointestinal problems.

Chromium

Found in many foods, chromium is an essential trace mineral. If you have too little chromium in your diet, your body can't use glucose efficiently. Studies, including a 2007 systematic review, have found few or no benefits of chromium supplements for controlling diabetes or reducing the risk of developing it. Many of the studies used for the review were small or not high quality.

Safety

Chromium supplements may cause stomach pain and bloating, and there have been a few reports of kidney damage, muscular problems, and skin reactions following large doses.

Diabetes and Dietary Supplements

Herbal Supplements

There is no strong evidence that herbal supplements can help to control diabetes or its complications.

- Researchers have found some risks but no clear benefits of **cinnamon** for people with diabetes.
 - A 2012 systematic review of 10 randomized controlled trials did not support using cinnamon for type 1 or type 2 diabetes.
 - A trial of 59 people with type 2 diabetes found that a combination of cinnamon, calcium, and zinc didn't improve their blood pressure.
 - When researchers tested samples of the common spice cassia cinnamon for sale at grocery stores in Europe, they found many samples contained coumarin, a substance that may cause or worsen liver disease in people who are sensitive. Also, eating large amounts of cinnamon containing coumarin may be especially risky for people taking blood-thinning drugs; the interaction of coumarin and blood thinners can increase the likelihood of bleeding.
- Researchers are studying whether **Asian ginseng** and **American ginseng** may help control glucose levels. Currently, research reviews and clinical trials show that there is not enough evidence to support their use.
- Other herbal supplements studied for diabetes include **aloe vera, bitter melon, Chinese herbal medicines, fenugreek, garlic, *Gymnema sylvestre*, milk thistle, nettle, prickly pear cactus, and sweet potato**. None have been proven to be effective.

Safety

Information on the safety of herbal supplements for people with diabetes is generally inconclusive or unavailable. Interactions between herbs and conventional diabetes drugs have not been well studied and could be a health risk. For example, in some people cinnamon might worsen liver disease and interact with blood thinners.

Magnesium

Found in many foods, including whole grains, nuts, and green leafy vegetables, magnesium is essential to the body's ability to process glucose. Magnesium deficiency may increase the risk of developing diabetes.

- There is no evidence from clinical trials that magnesium helps to manage diabetes.
- A 2011 meta-analysis reviewed the results of 13 studies that looked at how much magnesium people got in their diets, either through supplements or food, and their risk of diabetes. The review found that people who had lower magnesium intake had a greater risk of developing diabetes.
- One of the studies in the 2011 research review mentioned above, a large 2007 clinical trial, found that people who ate more cereal fiber and magnesium-rich food had a lower risk of developing type 2 diabetes.
- People who had a diet rich in magnesium had a 15 percent reduced risk of developing type 2 diabetes, according to a 2007 meta-analysis of studies that looked at magnesium from foods or supplements.

Diabetes and Dietary Supplements

Safety

No serious side effects were reported in studies where people with diabetes were given magnesium supplements for up to 16 weeks. However, the long-term safety of magnesium supplements for people with diabetes has not been established. Large doses of magnesium in supplements can cause diarrhea and abdominal cramping. Very large doses—more than 5,000 mg/day per day—can be deadly.

For more information on magnesium, see the Office of Dietary Supplements' (ODS) *Magnesium: Fact Sheet for Consumers* at ods.od.nih.gov/factsheets/Magnesium-Consumer/.

Omega-3s

Omega-3s supplements don't help people with diabetes control their blood sugar levels, a 2008 systematic review found. A 2012 study that combined a meta-analysis and a systematic review looked at the possible link between eating seafood or plants with omega-3s and the risk of developing type 2 diabetes. The study found little evidence that these dietary sources of omega-3s affected the risk of developing diabetes.

Safety

- Omega-3 supplements usually do not have negative side effects. When side effects do occur, they typically consist of minor gastrointestinal symptoms, such as belching, indigestion, or diarrhea.
- Omega-3 supplements may extend bleeding time (the time it takes for a cut to stop bleeding). People who take drugs that affect bleeding time, such as anticoagulants ("blood thinners") or nonsteroidal anti-inflammatory drugs (NSAIDs), should discuss the use of omega-3 fatty acid supplements with a health care provider.
- For more information on omega-3 supplements, see the NCCIH Web page at nccih.nih.gov/health/omega3.

Vitamins

- Studies (including a 2010 research review and 2009 clinical trial) have found no evidence that taking **vitamin C** supplements is helpful for diabetes.
- The research on diabetes and **vitamin D** and **calcium** supplements is not conclusive.
 - Supplementing with vitamin D combined with calcium appears to lower the risk of developing type 2 diabetes, according to a 2007 systematic review and meta-analysis.
 - In a 2008 clinical trial studying 33,951 post-menopausal women over 7 years, calcium plus vitamin D supplements did no better than a placebo at reducing the risk of developing diabetes.
 - The lower risk seen in some studies in people who consume more calcium may be because those individuals are also getting more magnesium, a 2012 meta-analysis reported.

Safety

Getting too much calcium may interfere with the body's ability to absorb [iron](#) and [zinc](#). Also, calcium supplements can interact with certain medicines.

For more information on calcium, see the ODS's *Calcium: Fact Sheet for Consumers* at ods.od.nih.gov/factsheets/Calcium-Consumer/.

Diabetes and Dietary Supplements

Other Supplements

- There is no strong evidence that supplements of the trace mineral **vanadium** improve blood sugar control in people with type 2 diabetes.
- The evidence is still preliminary on the effects on diabetes of supplements and foods rich in **polyphenols**—antioxidants found in fruits, grains, and vegetables, a 2010 research review concluded.

The Importance of Healthy Behaviors

Along with taking oral medications or insulin if needed, healthy eating, physical activity, and blood glucose testing are basic tools for managing type 2 diabetes. Managing your stress is also important, as stress can raise your blood glucose.

Diet

The National Diabetes Education Program (NDEP) recommends that you develop a diabetes meal plan with help from your health care providers. A healthy diet can help you feel better, lose weight if you need to, and lower your risk for heart disease, stroke, and other diabetes-related conditions. For more information about eating and diabetes, go to diabetes.niddk.nih.gov/dm/pubs/eating_ez/#eat.

Physical Activity

The NDEP recommends that people with diabetes set a goal to be more active most days of the week. Start slow by taking 10 minute walks, three times a day. Twice a week, work to increase your muscle strength. Your goal is 30 to 60 minutes of physical activity, such as brisk walking, on most days of the week, but always talk with your doctor before you start a new physical activity program.

Research has shown that being physically active can:

- Improve your blood sugar, blood pressure, and cholesterol levels;
- Improve your body's ability to use insulin;
- Strengthen your heart and bones;
- Keep your joints flexible; and
- Lower your risk of falling.

If You Have Diabetes and Are Thinking About Using a Dietary Supplement

- Talk to a health care provider before considering any dietary supplement for yourself, particularly if you are pregnant or nursing, or for a child. Many supplements have not been tested in pregnant women, nursing mothers, or children.
- Do not replace scientifically proven treatments for diabetes with unproven health products or practices. The consequences of not following your prescribed medical regimen for diabetes can be very serious.
- Keep in mind that dietary supplements may interact with medications or other dietary supplements and may contain ingredients not listed on the label. To learn more, visit NCCIH's Web page on dietary supplements (nccih.nih.gov/health/supplements).

Diabetes and Dietary Supplements

- Tell all your health care providers about any complementary or integrative health approaches you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

NCCIH-Funded Research

NCCIH-supported research includes projects studying:

- Whether melatonin supplements can help control metabolic syndrome, which often leads to diabetes
- The effects of restorative yoga in people with metabolic syndrome
- Whether acupuncture can improve the quality of life in people with painful diabetic neuropathy (nerve damage)
- N-acetylcysteine and milk thistle, nutritional supplements with antioxidant properties, for kidney damage that results from diabetes.

For More Information

NCCIH Clearinghouse

The NCCIH Clearinghouse provides information on NCCIH and complementary and integrative health approaches, including publications and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

Toll-free in the U.S.: 1-888-644-6226

TTY (for deaf and hard-of-hearing callers): 1-866-464-3615

Web site: nccih.nih.gov

E-mail: info@nccih.nih.gov

NIH Clinical Research Trials and You

The National Institutes of Health (NIH) has created a Web site, NIH Clinical Research Trials and You, to help people learn about clinical trials, why they matter, and how to participate. The site includes questions and answers about clinical trials, guidance on how to find clinical trials through ClinicalTrials.gov and other resources, and stories about the personal experiences of clinical trial participants. Clinical trials are necessary to find better ways to prevent, diagnose, and treat diseases.

Web site: www.nih.gov/health/clinicaltrials/

National Diabetes Information Clearinghouse

A service of the National Institute of Diabetes and Digestive and Kidney Diseases, NIH, the clearinghouse responds to inquiries, offers diabetes publications, and makes referrals. For an alphabetical list of publication topics, go to www.diabetes.niddk.nih.gov/dm/a-z.asp.

Toll-free in the U.S.: 1-800-860-8747

Web site: www.diabetes.niddk.nih.gov

Diabetes and Dietary Supplements

National Diabetes Education Program

The National Diabetes Education Program is sponsored by NIH and the Centers for Disease Control and Prevention, with many Federal, state, and local partners. Its services include information and publications on diabetes.

Telephone: 1-301-496-3583

Web site: www.ndep.nih.gov

PubMed®

A service of the National Library of Medicine (NLM), PubMed contains publication information and (in most cases) brief summaries of articles from scientific and medical journals.

Web site: www.ncbi.nlm.nih.gov/pubmed

MedlinePlus

To provide resources that help answer health questions, MedlinePlus (a service of the National Library of Medicine) brings together authoritative information from the National Institutes of Health as well as other Government agencies and health-related organizations.

Web site: www.medlineplus.gov

Information on diabetes: <http://www.nlm.nih.gov/medlineplus/diabetes.html>

Information on chromium: <https://www.nlm.nih.gov/medlineplus/ency/article/002418.htm>

Information on magnesium: <http://www.nlm.nih.gov/medlineplus/ency/article/002423.htm>

Selected References

- Balk EM, Tatsioni A, Lichtenstein AH, et al. Effect of chromium supplementation on glucose metabolism and lipids: a systematic review of randomized controlled trials. *Diabetes Care*. 2007;30(8):2154-2163.
- Chen W, Zhang Y, Liu JP. Chinese herbal medicine for diabetic peripheral neuropathy. *Cochrane Database of Systematic Reviews*. 2011;(6):CD007796. Accessed at <http://www.cochranelibrary.com/> on January 15, 2013.
- Dong J-Y, Xun P, He K, et al. Magnesium intake and risk of type 2 diabetes: meta-analysis of prospective cohort studies. *Diabetes Care*. 2011;34(9):2116-2122.
- [Geil P, Shane-McWhorter L. Dietary supplements in the management of diabetes: potential risks and benefits.](#) *Journal of the American Dietetic Association*. 2008;108(4 Suppl 1):S59-S65.
- Haritoglou C, Gerss J, Hammes HP, et al. Alpha-lipoic acid for the prevention of diabetic macular edema. *Ophthalmologica*. 2011;226(3):127-137.
- Hartweg J, Perera R, Montori VM, et al. Omega-3 polyunsaturated fatty acids (PUFA) for type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews*. 2008;(1):CD003205 [edited 2009]. Accessed at www.cochranelibrary.com on May 22, 2013.
- Leach MJ, Kumar S. Cinnamon for diabetes mellitus. *Cochrane Database of Systematic Reviews*. 2012;(9):CD007170. Accessed at www.cochranelibrary.com on September 11, 2013.
- Najm W, Lie D. Herbals used for diabetes, obesity, and metabolic syndrome. *Primary Care*. 2010;37(2):237-254.
- Suksomboon N, Poolsup N, Boonkaew S, et al. [Meta-analysis of the effect of herbal supplement on glycemic control in type 2 diabetes.](#) *Journal of Ethnopharmacology*. 2011;137(3):1328-1333.
- Teegarden D, Donkin SS. Vitamin D: emerging new roles in insulin sensitivity. *Nutrition Research Reviews*. 2009;22(1):82-92.
- Smith DM, Pickering RM, Lewith GT. A systematic review of vanadium oral supplements for glycaemic control in type 2 diabetes mellitus. *QJM*. 2008;101(5):351-358.

Diabetes and Dietary Supplements

Acknowledgments

NCCIH thanks the following individuals for their technical expertise and review of this publication: Paolo Fanti, M.D., University of Texas Health Science Center at San Antonio; Joanne M. Gallivan, R.D., NIDDK; Dariush Mozaffarian, M.D., Dr.P.H., Harvard School of Public Health; Margaret A. McDowell, Ph.D., M.P.H., R.D., NIH, Division of Nutrition Research Coordination; the NIH Nutrition Education Subcommittee; and Wendy Weber, N.D., Ph.D., M.P.H. and John (Jack) Killen, M.D., NCCIH.

This publication is not copyrighted and is in the public domain.

Duplication is encouraged.

NCCIH has provided this material for your information. It is not intended to substitute for the medical expertise and advice of your primary health care provider. We encourage you to discuss any decisions about treatment or care with your health care provider. The mention of any product, service, or therapy is not an endorsement by NCCIH.

U.S. Department of Health & Human Services • National Institutes of Health • National Center for Complementary and Integrative Health

nccih.nih.gov