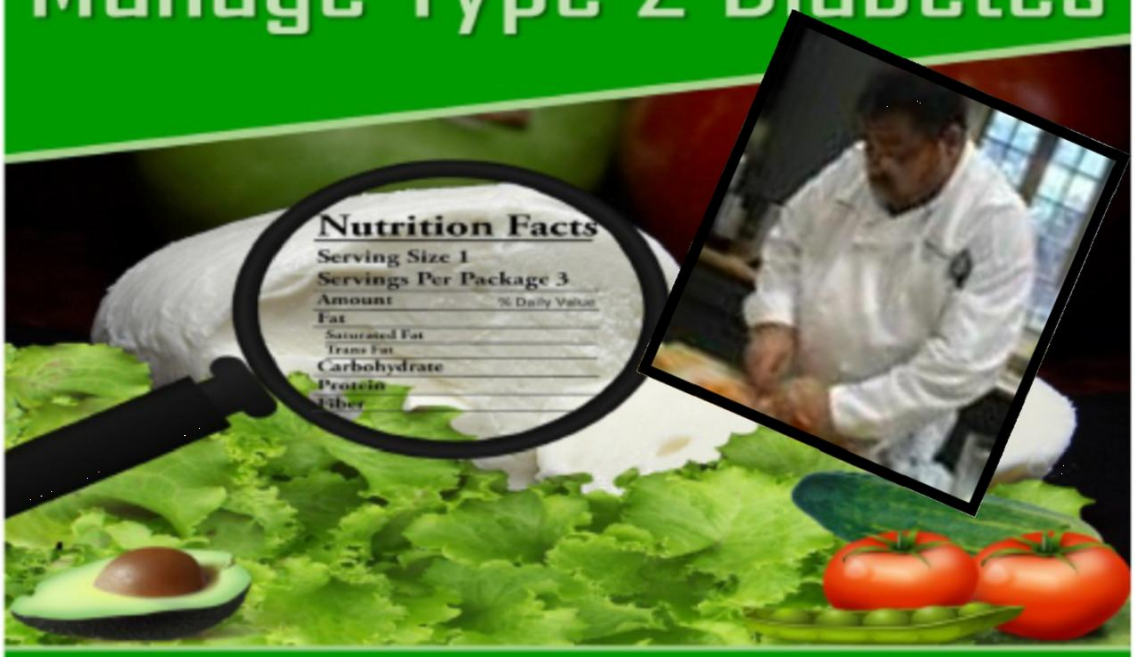
Global Fusion Americana E-Series

**Global Fusion Americana** *adj.* A form of cooking extracted from the history of the world that makes a new culture fusing it together in a melting pot. Through ideas ,religions ,foods, and customs bring people together thriving for taste that makes up the American food experience.

# Key Nutrients To Manage Type 2 Diabetes




## Learn How Micronutrients And Macronutrients Affect Blood Sugar

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Chef Murph is the founder of Humans for People Foundation, whose goal is to attempt to save donated food, giving in yet another life at food banks. He is a member of the Touch Food Bank of Camden, NJ an affiliate of Philabundance. He believes, Good food makes for better decisions and brings people and culture to the table to talk where problems can be solved. Chef Murph, act as a volunteer shelter chef cooking food regularly at homeless shelters, soup kitchens and missions around the country like Buffalo City Mission in Buffalo, NY, Joseph House Camden NJ and Veterans Multi-Service Centers, Nationwide.

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Disclaimer: The information in this publication is for informational purposes only; it is not intended as medical advice. Diabetes is a serious disease. You should always seek professional advice from a medical expert for diabetes or any medical problems you are experiencing.

# What Is Type 2 Diabetes

Diabetes mellitus is a chronic metabolic disorder marked by elevated blood glucose levels either as the result of inadequate insulin production in the body or due to the fact that the body's cells do not respond properly to insulin, or both.

In type 1 diabetes, referred to as insulin dependent, the body makes antibodies that destroy the islet cells of the pancreas, the organ responsible for producing insulin, which leads to high blood glucose levels. Once the death of the islet cells occurs, the process is irreversible and type 1 diabetics are forever dependent on insulin shots to make up for what the body cannot produce.

In type 2 diabetes, the pancreas does make enough insulin, but the cells in the body become resistant to it and even with elevated insulin levels there are inadequate amounts of glucose entering the cells, which results in elevated blood sugars that cause the same complications as type 1 diabetes. However, unlike type 1, type 2 may be reversed, and is attributed to unhealthy lifestyle choices, such as poor diet, lack of exercise and obesity.

Type 2 diabetes accounts for 90% to 95% of all 29.1 million cases of diabetes in the United States; this equates to 1 in 10 adults age 20 to 64 and 1 in 4 seniors age 65 or older.

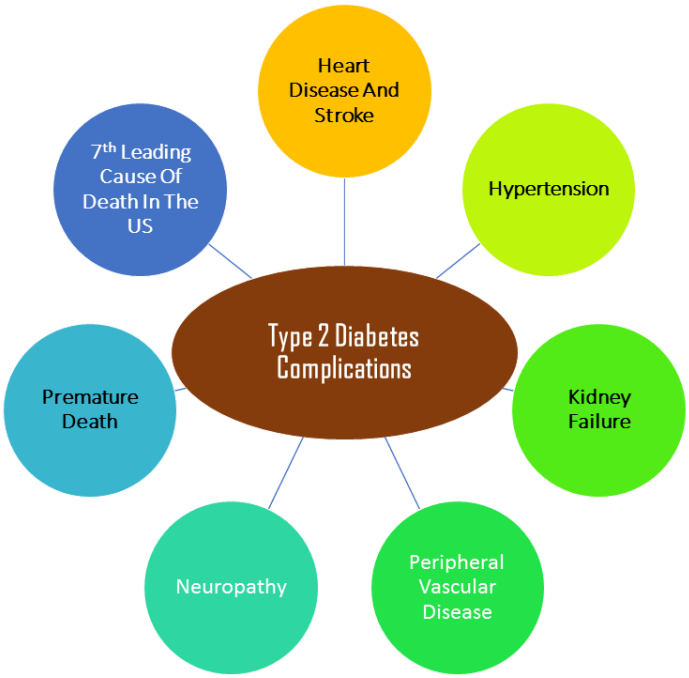
Prediabetes is the occurrence of insulin resistance and elevated glucose levels in the blood but not enough to meet the criteria for a diagnosis of type 2 diabetes. In 2012, 86 million people age 20 years or older were diagnosed with pre-diabetes, that's up from 79 million in 2010. If someone is prediabetic and continues with an unhealthy lifestyle, including diet and lack of exercise, eventually diabetes will occur.

### Diagnosis of Type 2 Diabetes

Diabetes is diagnosed by a doctor based on a lab test known as the Hemoglobin A1C (standardized diagnosis technique) that measures average blood glucose levels and reports them in percentage form. A normal A1C is below 5.7%. Prediabetes is indicated in the range of 5.7% to 6.4% and a reading over 6.5% means a person has diabetes.

## Health Complications

Type 2 diabetes has several serious health complications and risks for associated diseases, including, kidney disease, heart disease and stroke, hypertension, eye disease, peripheral vascular disease, diabetic neuropathy, hypertension, and premature death.




### The numbers illustrate the seriousness of this disease:

- 50% of diabetics die of heart disease and stroke
- 71% of adults with diabetes also have hypertension
- 44% of all kidney failures in 2011 were the result of diabetes
- 60% of all non-traumatic amputations of lower limbs occur in people with diabetes due to nerve damage

According to the Centers For Disease Control, those with diabetes are two times more likely to die from any cause versus those with diabetes. Diabetes is the 7$^{th}$ leading cause of death in the United States, with 69,000 deaths each year from diabetes alone, and diabetes is listed as a contributing factor toward death in another 234,000 death certificates.

## Treatment And Management

There is no known cure for type 1 or type 2 diabetes, though several medications are available to help control blood sugars in type 2 diabetes, and insulin is used to treat type 1.

> Type 2 diabetes is largely based on lifestyle choices like diet and exercise, with the obese at an especially high risk. Type 2 diabetes can be managed with medication, diet, and natural therapies in order to prevent the many complications associated with out of control blood sugar.

Thousands have been able to reverse type 2 diabetes with significant weight loss (based on post-bariatric surgery weight loss numbers) and statistics show that even a 5% to 7% loss in bodyweight can prevent or delay its onset indefinitely.

# The Role Of Nutrition

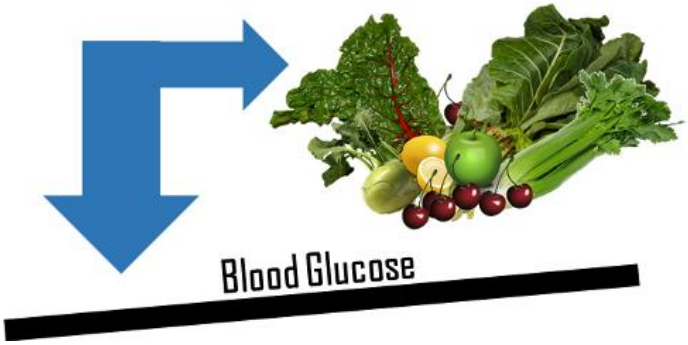
Nutrition is a critical part of type 2 diabetes care. A delicate balance of the correct amount of carbohydrates, fats, proteins, fiber, vitamins, and minerals allow those with diabetes to maintain healthy levels of blood glucose, which results in good health and can prevent the onset of complications. Diabetics must consider how blood sugar levels will respond to different diets and the foods included in them.

It is highly recommended that those who are diagnosed with diabetes and those with prediabetes who wish to prevent the onset of the disease seek professional care and support from a nutritionist who can assist with education and an appropriate dietary plan.

# Goals Of Medical Nutrition Therapy

The goals of medical nutrition therapy include:

- Attain normal blood glucose ranges to reduce risks for complications of diabetes.
- Reduce risk of macrovascular disease by attaining a healthy lipid and lipoprotein profile.
- Attain normal blood pressure to reduce the risk for vascular disease.
- To treat and prevent any chronic complications of diabetes by modifying unhealthy lifestyle choices to prevent obesity, heart disease, obesity, cardiovascular disease, dyslipidemia, hypertension, and nephropathy.




- Improve the diabetic's overall health and outlook by supporting a healthy diet and regular exercise.
- Assess and address individual nutritional needs, while being mindful of and respectful to cultural preferences and lifestyle along with considering and addressing the patient's willingness to make appropriate changes.

# Macronutrients

Macronutrients are nutrients that provide calories or energy to the human body, which are required for growth, metabolism, and many other functions. Macro means large, as these nutrients are needed in larger amounts than other types of nutrients, and they include:


- Carbohydrates
- Protein
- Fat

## Carbohydrates

Carbohydrates are often misunderstood and proliferate many myths. Carbohydrates are organic compounds that's chemical composition contains single, double, or multiple sugar units. Carbohydrates come in two main forms - simple and complex.

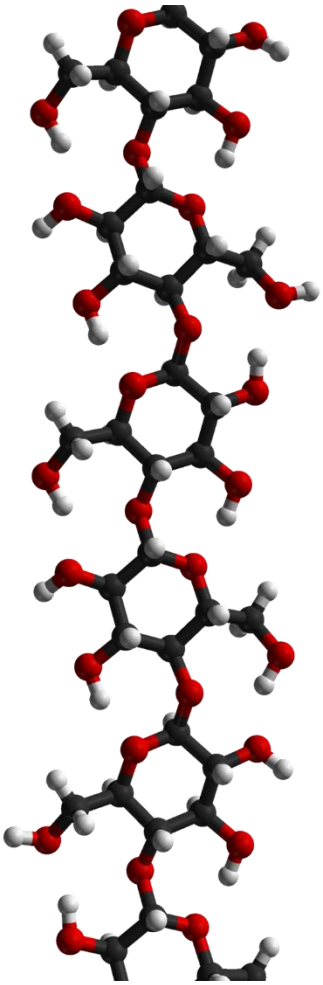
All plant-based foods contain carbohydrates in some form, but while all starches are carbohydrates, not all carbohydrates are starches, such as the case with most vegetables.

All simple sugars and starches get converted to glucose in our body (the only exceptions are sugar alcohols and insoluble fiber), but the speed with which this happens differs between the two and that is what is important as far as managing diabetes is concerned.

Simple Carbohydrates: Simple carbs include fast acting carbohydrate sugars and starches. Simple carbs digest quickly and so cause higher spikes in blood glucose levels as compared to complex carbs. Simple sugars are comprised of only one or two sugar (saccharide) chains and typically have a sweet taste.

Simple Carbs Include:

- Table sugar
- Candy
- Sweets
- Soda
- Fruit
- Honey
- Juice
- Syrups



Complex Carbohydrates: Complex carbs are comprised of thousands of sugar chains and have a starchy taste. These carbs digest slowly and incur gradual rises in blood glucose levels in large part because they have much longer saccharide chains.

The main difference between simple and complex carbs is how they are digested and absorbed along with chemical structure.

Complex Carbs Include:

- Starchy vegetables: corn, peas, and potatoes
- Starchy plant foods: beans
- Grains and grain products: bread, pasta, rice and cereal
- Fiber

## Complex Carbohydrates

Chemically, complex carbs are comprised of three or more linked sugars. In its strictest sense, the term complex carbohydrate encompasses any starch, including those that are refined, such as white bread, white rice, pasta, and white flour along with products made from it. However, the refining process strips fiber from these starches, and so unlike whole grains that are not stripped of essential nutrients they digest and are absorbed faster in the body, which can cause erratic blood sugar spikes, and therefore whole grains are recommended for those with diabetes.

Many studies support the need for complex carbohydrates in those with type 2 diabetes and prediabetes, obtained from foods such as, vegetables, whole grains, fruits, and low-fat or nonfat milk.

## Whole Grains

While whole grains can play an important role in the diabetic diet in providing valuable nutrients, including the all-important fiber and they are a much better choice than refined grains, it is still important to pay attention to portion sizes of any starches as they still have more impact on blood sugar than foods that do not impact blood sugars such as vegetables.

A home blood glucose meter is helpful in assessing how grains affect blood sugar levels after consumption. The America Diabetes Association recommends starches to compromise only 25% of a diabetic plate.

## Refined Carbohydrates

Refined carbs, which include any white starch, like white rice, pasta, bread and white flour products are carbohydrates that have been processed. As previously mentioned processing removes the bran and kernel and only leaves the starch. Since a lot of the fiber is removed, these carbs are digested quickly and flood glucose into the bloodstream at a faster pace than whole grains. Simple sugars can also be refined carbohydrates; one example is high fructose corn syrup.

## The Bottom Line For Carbs

The better carbs for those with diabetes and really anyone are unprocessed whole foods, such as whole grains, vegetables, and those with natural sugar, such as the lactose in milk and the fructose in fruit.

Ideally, a diabetes friendly diet will get most of its carbs from vegetables, and some of its carbs from whole grains and plant sources, like beans as these provide the all important fiber that plays a central role in managing type 2 diabetes.

Table sugar and foods with added sugar serve no value, they are empty calorie foods that offer no nutritional value, will cause blood sugar spikes, and should be greatly limited or avoided.

# The Role Of Fiber

Fiber helps to lessen the impact of carbohydrates on blood sugar levels. Fiber also helps to lower "bad" LDL cholesterol, which is of special concern to diabetics who are at a higher risk for heart disease. In fact, one major study found that those who ate a high fiber diet enjoyed a 40% lower risk of coronary artery disease than people whose diet was low in fiber. Fiber can be obtained from many food sources, and not just grains.

Soluble fiber in particular binds moisture in the digestive system into a soft gel, which delays the absorption of nutrients in the body and therefore slows the rise of blood sugars after a meal.

Fiber has many more benefits beyond stabilizing blood sugars, in that it helps to prevent heart disease, improves digestion, and it's filling, adding to satiety, which greatly helps with weight loss efforts that in turn benefits the management of type 2 diabetes.

Green leafy vegetables and green vegetables are high in fiber and low in calories and benefit the human body on a number of levels, by providing essential vitamins and minerals, and important antioxidants, which many diabetics can use more of in their diets.

## Fiber Rich Foods:

- Fresh fruits and vegetables and especially green and leafy green varieties
- Nuts and seeds
- Dried beans and peas

- Whole Grains: bread, wild rice, whole grain flours, and crackers
- Brown rice and wild rice

### Net Carbs

For those managing blood sugars, a valuable formula to learn is how to calculate Net Carbs, which is the actual amount of carbs a food has that will affect blood sugars.

**The formula is simple, look at the food label, and figure:**

*Total Carbohydrates - Dietary Fiber - Sugar Alcohols = Net carbs*

That result of net carbs reflects the amount of carbs that food has that will significantly affect blood sugar level or its glycemic load.

## The Glycemic Index

The Glycemic Index (GI) is a rating system that rates foods based on how fast they dump sugar into the bloodstream. The scale ranges from 0 to 100, and one example of the differences in GI scores is broccoli that has a GI load of 15 while corn has a 54. 1 cup of white processed rice has a score of 64, while whole grain wild rice has a load of 16. As you can see, the differences are substantial.

High GI foods are often referred to as insulin triggers
because of the impact they can have on blood sugar levels.

## Factors That Influence Glycemic Load

Several factors influence the GI score of foods.

- **Processing:** The more a food is processed the higher its GI score tends to be. For example, instant oatmeal has a GI of 79; while steel cut oats have a 55.
- **Food combinations:** Eating combinations of certain carbs during one meal can also affect glycemic load, so it can be helpful to combine a high GI food, such as rice with a lower GI carb, such as steamed vegetables.
- **Cooking time:** Longer cooking times can also, increase the glycemic load of food because the cooking process further breaks down starches causing them to pass through the body faster once eaten.
- **Acidity:** Acidity makes a difference as the more acidic a food the lower the GI, such as pickling that uses vinegar or lemon juice. Sourdough bread that uses a lactobacillus or lactic acid culture as part of the leavening process will have a lower GI score than white bread.
- **The Coat:** The naturally occurring coat on food makes a difference in glycemic load. The fibrous coat over beans, seeds, and plant cell walls found on whole grains is a physical barrier that facilitates slow digestion when carbs are broken down in the stomach. This is one of the reasons that whole grains and beans have a lower GI than processed grains, where processing removes that fibrous coat.

# Scientific Evidence For Low GI Diets In Diabetes

Several large prospective studies found that high dietary glycemic loads have been associated with an increased risk of developing type 2 diabetes. One study published on the American Diabetes Association Diabetes Care journal concluded that choosing low-

GI foods in place of conventional or high-GI foods had a small, though clinically useful effect for glycemic control in patients with diabetes.

Overall, the many studies conducted into a "low GI diet" for diabetes have yielded mixed results.

The American Diabetes Association's standards of care recommend the use of the glycemic index as having a modest additional benefit for glycemic control, versus that observed when total carbohydrate intake is considered on its own. This opinion mainly stems from the fact that a lot of conflicting evidence exists as to the overall benefit of managing blood sugar by *solely* using the Glycemic Index without any other dietary considerations.

Using A GI alone can be problematic when you consider that several foods considered unhealthy for those with diabetes can have a score close to those that are, for example:

Vanilla cake made from a box mix with Betty Crocker vanilla frosting has a GI of 42, while an orange ranks a 43?

Now, when one looks at that which would they choose if they are solely basing their decision on GI score?

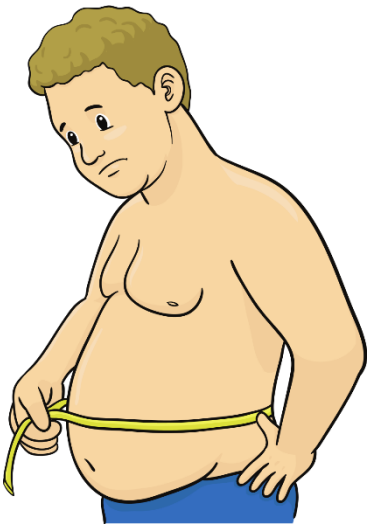
They should choose the orange if they understand that the orange is a natural sugar that is much better quality than the refined sugar that is in that cake and frosting, and that the orange also provides loads of other nutrients, while the cake provides none.

However, if that someone is only using the GI score to gage the value of the food this can lead to unhealthy choices.

## The GI And Obesity

A diet comprised of low GI foods does facilitate weight loss. This stems from the fact that a low GI diet is typically comprised of weight loss friendly foods, and those that are often included in a healthy and well balanced diet, such as vegetables, whole grains, and lean protein.

In general, food high on the GI scale is typically refined, processed and what is considered empty calorie food that contributes to weight gain and obesity with a BMI of 35 or greater is a major risk factor for type 2 diabetes.



### Bottom Line Of GI

Is a low GI enough to manage diabetes? Maybe. For some people, a commercial low-GI diet may actually provide the much-needed direction to making healthier food choices. However, experts still contend that a glycemic index should not be used in isolation, and other factors need to be considered when managing diabetes, and targeting healthier bodyweight, which include, calorie control, lean protein, vitamins and minerals, monitoring fat intake, fiber, and other essential nutrients. Exercise should also play an important role in healthy weight management.

## Protein

Protein is a macronutrient that does not have a direct effect on blood sugar levels. People with diabetes should consume the same amount of protein as those without the disease. The National Institutes of Medicine recommend that 10% to 35% of one's total daily calories come from protein. This number varies because factors like bodyweight, activity level, age, physique goals, and any medical conditions help to determine a more personalized number on an individual basis. Diabetics who have kidney problems need to limit protein intake.

The main consideration as to protein intake in a diabetes friendly diet is saturated fat. Again, those with type 2 diabetes are at a higher risk for heart disease and so saturated fat intake needs to be carefully considered.

Animal protein sources are typically higher in saturated fat and cholesterol that can lead to heart problems, blood vessel disease, stroke, and subsequently premature death.

It is therefore important to consider the source of protein in a diabetic diet. Choosing lower fat protein sources, such as that from plant-based sources like beans, along with lean meat, poultry, fish, and dairy is important.

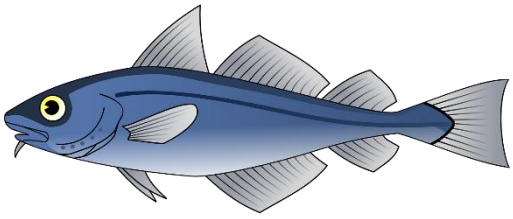
## Plant-Based Proteins

Plant-based protein foods offer higher quality nutrition for diabetics, which include protein, healthy fats, and fiber.

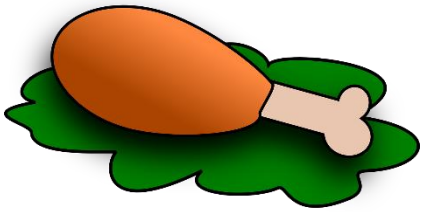
- Beans such as black, kidney, and pinto varieties
- Lentils
- Peas
- Soy protein and soy beans
- Hummus and falafel
- Nuts and almond butter, or peanut butter
- Tempeh and tofu
- Meatless vegan products, such as burgers, bacon and hot dogs

## Fish and Seafood

Fish has many health benefits, and oily fish like Salmon, Herring, Albacore tuna, rainbow trout, mackerel, and sardines provide heart healthy polyunsaturated omega-3 fatty acids. The American Diabetes Association recommends 2 servings of fish per week.



## Poultry



Healthy poultry choices include those without skin and those less in saturated fat and cholesterol, including:

- Egg whites and egg substitutes
- Chicken, turkey, and Cornish hen

### Are High Protein, Low Carb Diets Recommended?

While these types of diets have become a popular means of weight loss, currently there is not enough evidence to support their usefulness for those with type 2 diabetes. The American Diabetes Association recommends a well-balanced diet that includes all the food groups.

# Fat

Fat is another macronutrient that has no significant effect on blood sugar levels. Like carbs, fat is often the victim of many myths that are typically involved in drastic low fat diet crazes. The truth is that the body needs fat; the main consideration is to choose healthy fats and limit those that are known to be harmful for the heart. As previously, mentioned, those with diabetes are at a higher risk for heart disease and so fat intake is an important consideration in that respect.

## 3 Types Of Fat

- **Heart Healthy Fats:** These are monosaturated and polyunsaturated fats with a recommended intake of 20% To 35% of total daily calories. Heart healthy fats have many benefits, including, lowering bad LDL cholesterol, and raising good HDL, lowering risks for heart disease, and stroke, providing essential omega fats the body does not produce on its own, promoting cell and brain health, and providing energy.

- **Unhealthy Fats:** Saturated fat is an unhealthy fat and so should be limited to 10% or less of daily calories. Eating too much saturated fat raises cholesterol in the blood, which increases risk for heart disease. In addition, foods high in saturated fats are high in calories, which can cause weight gain and exasperate type 2 diabetes.


- **Very Unhealthy Fats:** Trans fats are very unhealthy fats with a recommended intake of 5% or less of daily calories, the lower the better. Trans fats generally refer to man made fats that are hydrogenated to chemically change the structure of the fat molecules, and are believed to be very harmful to health. Trans fats are often found in processed food.

To lower the risk of heart disease in people with diabetes, a diet with much less saturated and trans fats and one that includes healthy mono and polyunsaturated fats including omega-3s is recommended.

### Monosaturated Fat Foods


- Olive oil, canola oil, peanut oil, safflower oil, and sesame oil
- Avocados
- Peanut butter
- Many nuts and seeds

### Polyunsaturated Fat Foods

Omega-6 Fatty Acids Sources


- Soybean oil
- Corn oil
- Safflower

- Walnuts and seeds

Omega-3 Fatty Acids Sources

- Salmon, herring, Albacore tuna, rainbow trout, mackerel and sardines
- Soybean oil
- Canola oil
- Walnuts
- Flaxseed
- Beef
- Soybeans
- Tofu
- Shrimp
- Brussels Sprouts
- Cauliflower


## Diabetes And Low Fat Diets

While it is advisable to lower healthy fat intake as much as possible for a diabetes friendly diet, some low fat diets fall under scrutiny because they require a relatively high amount of carbohydrates that can lead to overproduction of insulin, increased hunger and consequently weight gain, which furthers the development of and complications of type 2 diabetes.

# Micronutrients

Micronutrients include vitamins and minerals, which are required by the body in small quantities to ensure normal growth, metabolism, and overall physical well-being.

## Vitamins

Vitamins are essential organic nutrients, and most are not made naturally by the body or only made in insufficient amounts. Most vitamins are obtained from food, so when the diet is unhealthy, vitamin deficiency disorders occur. While micronutrients are only required in small amounts as compared to macronutrients, they are just as important for good health and overall nutritional intake.

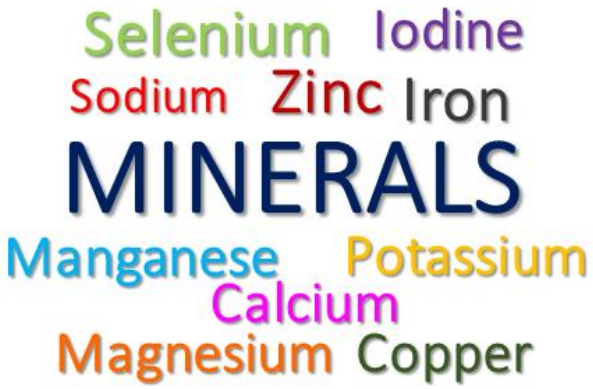
Essential vitamins include:

- Vitamin A
- Beta-carotene
- B Vitamins
- Biotin
- Vitamin C
- Vitamin D
- Vitamin E
- Folic acid
- Vitamin K
- Niacin
- Pantothenic acid

# Minerals

Minerals are inorganic nutrients that support health and wellbeing in various ways, they include:

- Copper
- Iodine
- Iron
- Manganese
- Selenium
- Zinc
- Calcium
- Magnesium
- Potassium
- Sodium




No single food contains or provides all the vitamins and minerals the body needs so a well-balanced diet is important for anyone, and especially those with metabolic disorders like type 2 diabetes. Those with type 2 diabetes benefit greatly from consumption of adequate amounts of vitamins and minerals from natural food sources, and may in individual cases require supplementation.

While deficiency can be difficult to assess, some populations diagnosed with type 2 diabetes, such as seniors, pregnant or lactating women, vegans, those on calorie-restricted diets are those who can often benefit from vitamin supplement therapy.

Patients who do not follow a healthy diet and have out of control blood sugars are also candidates for supplementation since they do not get their nutrients from healthy food choices. While doctors and nutritionists need to encourage their patients to meet their daily

micronutrient needs from diet, when this cannot be achieved, a daily multivitamin may be recommended.

## Vitamins Of Interest In Type 2 Diabetes

### Magnesium

The mineral magnesium serves as an essential cofactor for more than 300 enzymes. An association has been established in magnesium deficiency and hypertension, insulin resistance, the insulin secretion process, cardiovascular disease, glucose intolerance, dyslipidemia, and complications of diabetes. Whether poor magnesium status plays a causal role in these disorders or is simply associated with them has not yet been determined.

Magnesium deficiency is common in both type 1 and type 2 diabetes cases and a low level of dietary magnesium intake has been linked with incidence of type 2 diabetes in 46 out of 47 studies. Magnesium levels may also fall to dangerously low levels in people with diabetic retinopathy.

Magnesium is found in dark leafy greens, nuts, fish, whole grains, yogurt, bananas, dark chocolate, seeds, and beans. All these foods are recommended as part of a well-balanced diet.

The current recommended daily value (DV) for magnesium is 400mg daily for men under 30 and 420mg/day for men over 30. For women under 30 the RDA is 310 mg/day and 320 mg/day for women over 30 years of age.

### Biotin

According to the National Institutes Of Health, biotin alone does not have a direct effect on blood sugar levels in those with type 2 diabetes. However, some evidence exists that a combination of biotin and chromium may lower blood sugar in those patients whose blood sugar is poorly controlled by prescription medicines. Some promising early evidence has shown that this same combination can reduce ratios of bad to good total cholesterol levels in people with

type 2 diabetes. Some evidence also exists that biotin may reduce nerve pain in people with diabetes.

## Chromium

The National Institutes Of Health report that evidence exists as to the taking of chromium picolinate to lower insulin levels, decrease fasting blood sugar, and to encourage insulin to work more efficiently in people with type 2 diabetes. Some researchers do not yet believe that chromium is effective for everyone with diabetes, but may only be so for those with poor nutrition or low levels of chromium, a not uncommon predicament in people with diabetes.

## Inositol

Inositol supports normal nerve function and shows promise as a treatment for diabetes related neuropathy.

## L-Carnitine

L-Carnitine can help fatigue in diabetes patients as this amino acid allows the body to utilize fat more efficiently.

## Vitamin B6

Diabetic neuropathy, which is severe damage caused to the nervous system by high blood sugar levels, might be linked to vitamin B6 (pyridoxine) deficiency, though no direct evidence exists to date.

Pyridoxine supplements might be able to improve glucose tolerance, especially for those with gestational diabetes, or women who have impaired glucose tolerance that is caused by birth control pills.

## Vitamin B12

Vitamin B12 may play a role in treating diabetic neuropathy because B12 supports healthy functioning of nerve cells.

## Vitamin D

Vitamin D is a fat-soluble vitamin that plays a role in bone, teeth, and joint health along with assisting in immune system function.


Vitamin D is believed by some scientists to help improve the body's sensitivity to insulin, in turn reducing its insulin resistance, a precursor to type 2 diabetes.

Vitamin D deficiency can be assessed through a 25-hydroxyvitamin D blood test; the ideal blood level should be 60ng/ml.

Vitamin D can be obtained naturally by simply spending 15 minutes per day in the sunlight. It can also be obtained from oily fish, mushrooms grown in sunlight, egg yolks, beef liver, cod liver oil, nuts, fortified orange juice, milk, and some fortified cereals. Vitamin D supplements are also available.

### Vitamin D can also affect type 2 diabetes in other ways:

Weight loss can significantly improve the diabetic outlook and obesity is a major risk for type 2 diabetes. Studies have shown that a healthy vitamin D status helps to reduce the release of and levels of a hormone called parathyroid (PTH), which plays a role in promoting weight loss and reducing the risk of obesity.

Additionally, vitamin D can increase the hormone leptin, which regulates appetite, and controls body fat storage. Increasing sensations of satiety can help to lower hunger levels and facilitate weight loss.

Vitamin D can help to lower levels of the stress hormone cortisol, which in high and prolonged amounts can lead to an increased amount of visceral fat (belly fat) which is another risk factor for type 2 diabetes, among other serious complications such as a significantly shortened life span for both men and women.

Any increases in vitamin D need to be approved by your doctor to be sure that it will not interact with any diabetes medication.

## Micronutrient Supplementation: The Bottom Line

Studies as to the benefits of micronutrient supplementation for type 2 diabetes are mixed. The American Diabetes Association does not recommend supplementation beyond that which is recommended for the general population for the diabetes patient, and advocates the intake of all essential micronutrients through a balanced diet.

ANY supplementation should be supervised by a doctor or certified nutritionist to ensure safety and appropriateness for individual patient needs.

# Sodium

High intake of sodium is linked to elevated blood pressure levels, and high blood pressure is linked with a three times higher risk for heart disease and stroke. Blood pressure is particularly important for people with diabetes because it increases the risk of microvascular complications such as retinopathy, nephropathy (kidney disease) and neuropathy (nerve damage).

In addition, sodium, like fat consumption is of special concern due to risks of heart disease for people with diabetes who are already at a higher risk.

### Recommended Intake Of Salt

The American Diabetes Association recommends that those who have diabetes limit their salt intake to 2300 mg or less per day, though it is important to check with your doctor as this number can change based on individual circumstances. The easiest way to limit salt intake is to eat whole food, and stay away from processed and junk foods.

# Antioxidants

Antioxidants prevent cellular damage that stems from free radicals. They are found naturally in plant food. Diabetes is a chronic metabolic disorder that's marked by insulin deficiencies or insulin resistance resulting in hyperglycemia and disturbances of carbohydrate, lipid, and protein metabolism. Several studies suggest that oxidative stress plays a central role in the pathology of this disorder. Oxidative stress occurs in the body when it cannot counteract or detoxify the harmful effects of free radicals. This has promoted the investigation into the use of antioxidant therapy as a complementary therapy approach for type 2 diabetes.

The process of oxidation has also been linked to the development of diabetic retinopathy, which is a complication of diabetes that causes damage to the nerves of the eye. Antioxidants may be of use as a preventative treatment for retinopathy.

### Antioxidant Rich Foods

- Purple, Red, and Blue Grapes
- Blueberries
- Red Berries
- Tomatoes
- Nuts
- Dark Green Vegetables
- Sweet Potatoes
- Orange Vegetables
- Tea
- Whole Grains

- Beans
- Oily Fish

## Antioxidants Of Interest For Type 2 Diabetes

# Coenzyme Q10

Coenzyme Q10 is a compound that is made by the body, and used in sugar metabolism, and diabetics have been known to suffer from deficiencies of this compound. A few studies have shown that lab animals who suffer from diabetes also have a coenzyme Q10 deficiency. Some promising clinical trials have shown that coenzyme Q10 supplements may help to lower blood sugar levels.

# Vitamins C And E

Two major studies found no significant associations between vitamin C and E intake and the occurrence of diabetic retinopathy, though one of the studies did show a reduced risk for the disease when supplements were taken for more than three years.

Another study (Desai N K et al, NJIRM 2013) with the goal of demonstrating increased oxidative stress in newly diagnosed type 2 diabetes patients by measuring antioxidant enzymes activities found that antioxidant therapy with vitamin C and vitamin E in addition to an oral hypoglycemic agent reduced oxidative stress.

# Alpha-Lipoic Acid and Gamma-Lipoic Acid

Alpha-lipoic acid (ALA) is an antioxidant that is found in liver, kidney, spinach, and potatoes. It is also man made for use as medicine. ALA is used to treat pain and numbness in the legs and arms for those with diabetic neuropathy. Some studies have shown that ALA may play a role in lowering insulin resistance, though the evidence is limited.

Gamma-lipoic acid (GLA) is an antioxidant that is found in various plant seed oils, such as evening primrose oil and other natural oils. Early evidence shows promise as to its effectiveness in improving nerve function in those with diabetic neuropathy.

## Resveratrol

Researchers from the University of Alberta conducted a study to test the effectiveness of the antioxidant resveratrol in a group of low-birth weight lab mice. These mice' attempts to put on weight quickly after birth in order to catch up to a normal developmental stage prompted metabolic changes that may have predisposed them to type 2 diabetes. This same process occurs in human babies.

The study showed that mice who were fed diets rich in resveratrol were much less likely to develop metabolic syndrome, which is a well-known risk for type 2 diabetes that's marked by insulin resistance, high cholesterol, high blood pressure, and unhealthy belly fat. Jason Dyck, who led the study, commented that when a fetus' growth is restricted in the uterus it might cause genetic changes in how the body will store calories that would otherwise be burned.

The study found that resveratrol may counteract the effects of these genetic changes, and significantly reduce the chances of developing metabolic syndrome, which may lead to type 2 diabetes.

Resveratrol has been the focal point of many studies because it is believed to support healthy cardiovascular function and brain health. The Mayo clinic reports that resveratrol may have the ability to reduce inflammation and blood clotting and is an antioxidant that shows hope in

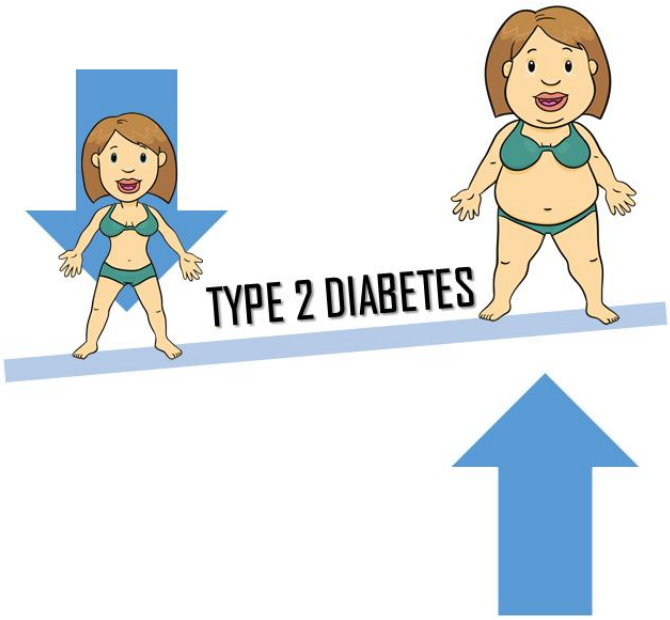
reducing heart disease. Many studies have prompted the support of those who drink red wine enjoying a glass a day for heart health.

The most abundant natural sources of resveratrol are muscadine grapes, Vitis vinifera, and labrusca, which are grapes used to make wine. One cup of fresh red grapes contains .24 to 1.25mg of resveratrol. Peanuts also contain some resveratrol.

# Weight Loss And Type 2 Diabetes

Since a bodyweight reduction of as little as 5% to 7% can yield significant improvements in insulin sensitivity, decrease the need for diabetes medications, and delay or prevent the onset of type 2 diabetes, weight loss is one of the best ways to manage the disease.

It is also worthwhile to note that significant weight loss has led to people reversing their type 2 diabetes. A landmark study recently conducted at the Cleveland Clinic showed bariatric surgery to provide long-term control of type 2 diabetes as a result of significant weight loss.




The STAMPEDE trial is one of the largest randomized trials that included a very long subject follow up period to compare medical therapy with bariatric surgery.

At the three-year mark, the results of the trial showed that 37.5% of the patients who had gastric bypass surgery with significant weight loss achieved blood sugar control without the use of any diabetic medications compared with the other two groups, who used medical therapy only or had a sleeve gastrectomy.

This correlates with a weight loss five to six times greater on average for the subjects who had bariatric surgery versus those who had intensive medical therapy. It is also important to note that this study used a more aggressive target to define blood sugar control than the one used by the American Diabetes Association, with a hemoglobin A1C of less than or equal to 6%. This

study, as others underscores the importance of weight loss in managing and reversing type 2 diabetes.

# Optimal Health Care

There is absolutely no doubt that nutrition plays a key role in managing type 2 diabetes and preventing its many serious complications. Patients greatly benefit from comprehensive education into dietary choices and assistance with the management of the disease by a qualified and caring health professional, such as a medical doctor, holistic practitioner, physician's assistant knowledgeable in diabetes, and/or a nutritionist.

Those health care providers who are interested in promoting the optimal health of their patients are those who are unbiased resource of the many treatment options available based on individual needs, which may or may not include nutritional supplementation.

They will also be those who are open to and knowledgeable about advances in science and new treatment regimens as they become available. They will also be mindful of any dangerous therapies.

A good health care provider will encourage their patients to own their diabetes and to be proactive in the lifestyle choices they make that will be of greatest benefit to the

management of their disease.