

Diabetes Mellitus: Nutritional Guidelines for Optimizing Blood Sugars

What is Diabetes?

There are two types of diabetes, Type I and Type II. Both involve your body's production of, or sensitivity to, insulin, a key hormone necessary for survival. Type I diabetes usually is diagnosed in childhood or early adolescence; it occurs as a result of the body's inability to produce insulin due to an autoimmune response that damages the beta-cells of the pancreas. Beta-cells are the cells that secrete insulin. Type II diabetes is usually diagnosed after the age of 40 and is often associated with obesity, high blood cholesterol and triglycerides, and hypertension. Type II diabetes is characterized by the body's insensitivity to insulin. Insulin is a carrier molecule for sugar (glucose) in the body. It facilitates the passage of glucose from the blood stream to the cells where glucose is used to fuel the cells. Insulin also plays a role in storing excess glucose as fat and has some influence on appetite receptors in the brain. Both Type I and Type II diabetics suffer from blood glucose abnormalities. A lack of insulin or an insulin insensitivity can cause high blood glucose (hyperglycemia). On the other hand, a surge in insulin via an insulin injection or from the pancreas secreting too much insulin to try to override insulin insensitivity can cause low blood glucose (hypoglycemia).

Recurrent periods of *hyperglycemia* cause many harmful symptoms and eventually can lead to death from any number of degenerative diseases. Hyperglycemia damages the heart, liver, and kidneys, affects nerve signals and sensation in the limbs and causes cell degeneration. Episodes of *hypoglycemia* (low blood glucose) cause irritability, irrational behavior, and can result in unconsciousness.

Diet has always played a very important role in the management of diabetes, as food is the source of glucose in our bodies. However, the types of diets recommended have changed over time. Because of the higher likelihood for diabetics to develop heart problems and kidney failure, doctors once prescribed low-fat, high complex-carbohydrate diets targeting the symptoms. Dietary fats were considered to be the primary cause of heart and kidney problems. However, controlling blood glucose levels on this type of diet is very difficult. Diabetics, even on a strict low-fat, high complex-carbohydrate diet experienced a daily roller-coaster of too high and too low blood glucose levels.

In order to alleviate these symptoms and to control blood glucose levels, the current dietary recommendations involve high protein amounts and very little carbohydrate intake. On a high protein/low carbohydrate diet some type II diabetics have been able to completely reverse their symptoms and eliminate the need for insulin or other medication. While on this diet type I diabetics, who will always need insulin, can exert much greater control over the amounts of insulin they inject as well as over their blood glucose levels at all times, improving their health and quality of life. Diabetes treatment may include insulin, hyperglycemic medications, diet and exercise. Weight loss and exercise can and usually do increase insulin sensitivity.

Why a High Protein Diet?

The grave long-term consequences of diabetes, the nation's third leading cause of death, can be prevented and even reversed if caught in time by keeping blood glucose **normal** around the clock. Normal blood glucose levels are approximately 80 – 100 mg/dl, 85 being optimal.

The three main food types that are used by the body for energy are fats, carbohydrates and proteins. Fats have little significance in blood glucose levels. Carbohydrates have a big—and fast—affect. They are

composed of long chains of sugars. Digestion of carbohydrates begins in the mouth with the saliva and continues through the digestive process. Digestion of most carbohydrates is very quick as long chains of sugars are broken down to their smaller components. About 90 to 95% of carbohydrates are broken down to glucose, entering the blood stream within minutes. Proteins are also broken down in the digestion process, but they are digested more slowly and only about 10% of proteins are broken down to glucose.

What this means to the diabetic is: as carbohydrates are eaten, they are quickly digested and blood glucose levels rise immediately. Even if insulin was recently injected, it cannot act fast enough to keep blood glucose levels within their normal range. Proteins, on the other hand are digested slowly enough that insulin has time to do its job, and a diabetic can easily control blood glucose levels, keeping them within the very narrow range that a non-diabetic's body does naturally.

Blood glucose control can be achieved by setting up a plan that includes insulin shots if needed and a diet strictly designed to give you more protein and fewer carbohydrates. The formula below will help you in making food choices.

This diet, with fewer restrictions, can also be used for people with reactive hypoglycemia. Reactive hypoglycemia, characterized by the development of symptoms of hypoglycemia (headache, anxiety, irritability, craving for sweets, depression, etc.) three to five hours after a meal, is often a precursor to diabetes. However, with proper diet and exercise, the risk of developing insulin-resistance or of wearing out the beta-cells in the pancreas is reduced.

Meal Formula:

Breakfast: 6 grams carbohydrate + amount of protein necessary to fill you up (as determined by you and your doctor. Remember that weight loss is an important factor in decreasing insulin resistance).

Lunch: 12 grams carbohydrate + amount of protein necessary to fill you up.

Dinner: 12 grams carbohydrate + amount of protein necessary to fill you up.

Use a Glucometer

It is necessary to test blood glucose levels on a regular basis throughout the day in order to determine how well your diet is working, to regulate your medication needs, and to make modifications as necessary. Using a glucometer, test your blood glucose levels upon waking, before meals, two hours after lunch, before bed, and before and/or during exercise to assess your pattern of blood glucose regulation. Go over your blood glucose charts with your doctor during each visit so that changes can be discussed.

So, What Can and Can't I Eat?

Don't Eat:

Sweets and Sweeteners

- Powdered sweeteners
- Candies, including so-called sugar-free types
- Honey and fructose
- Most "diet" and "sugar-free" foods
- Desserts and pastries: cakes, cookies, pies, tarts, et cetera
- Foods containing, as a significant ingredient, products whose names end in -ol or -ose (dextrose, glucose, lactose, mannitol, mannose, sorbitol, sucrose, xylitol, xylose, etc.)
- Corn syrup, molasses, maple syrup

Sweet or Starchy Vegetables

- Beans (chili beans, chickpeas, lima beans, lentils, sweet peas, etc.; string beans are ok as are many soybean products)
- Beets
- Carrots
- Corn
- Onions, except in small amounts
- Packaged creamed spinach containing flour
- Parsnips
- Potatoes
- Tomatoes, tomato paste, tomato sauce, and raw tomatoes except in small amounts
- Winter squash

Fruit and Juices

- All fruits (except avocados)
- All juices (including tomato and vegetable juices)

Certain Dairy Products

- Milk
- Sweetened and low-fat yogurts
- Cottage cheese (except in very small amounts)
- Powdered “milk substitutes” and “coffee lighteners”

Grains and Grain Products

- Wheat, rye, barley, corn, spelt, triticale, teff, amaranth, quinoa, millet, buckwheat, etc.
- White, brown, or wild rice
- Pasta
- Breakfast cereal
- Pancakes and waffles
- Bread, crackers, and flour products

Prepared Foods

- Most commercially prepared soups
- Most packaged “health foods”
- Snack foods (virtually anything that comes wrapped in cellophane)
- Balsamic vinegar (compared to wine vinegar, white vinegar, or cider vinegar, balsamic contains considerable sugar)

Do Eat (organic sources as much as possible):

Vegetables

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| ➤ Asparagus | ➤ Spinach |
| ➤ Onions (in small amounts) | ➤ Cabbage and sauerkraut |
| ➤ Avocado | ➤ String beans |
| ➤ Peppers (any color) | ➤ Cauliflower |
| ➤ Broccoli | ➤ Summer squash and zucchini |
| ➤ Mushrooms | ➤ Eggplant |
| ➤ Brussels sprouts | ➤ Lettuce and spring greens |

2/3 cups cooked vegetable or 1 cup of mixed salad acts upon blood glucose as if it contains about 6 grams of carbohydrate. Cooked vegetables tend to raise blood glucose more rapidly than raw vegetables.

Meat, Fish, Fowl, Seafood, Eggs

These should be your main sources of protein and caloric intake.

Tofu, Soybean substitutes for Bacon, Sausage, Hamburger, Fish, Chicken and Steak

If you don't feel comfortable eating large amounts of meat, these can be substituted, but be sure to read food labels and count protein and carbohydrate amounts into your meal plan.

Dairy Products:

- Most cheeses (except cottage cheese) – 1 oz of cheese = 1 gram carbohydrate
- Butter
- Whole Cream – 1tbsp = 0.4g carbohydrate
- Yogurt – plain, whole milk, without fruit – 8oz container = 11 grams carbohydrate and 2 oz protein
- Soy Milk – unsweetened

Other Foods:

- Some soups – check labels or make your own
- Herbs and Spices
- Mustard
- Soybean flour – ¼ cup = 7.5 grams slow-acting carbohydrates
- Bran-A-Crisp crackers
- Stevia – as a sweetener – carbohydrate free
- Toasted Nori
- Flavor Extracts
- Low-carbohydrate salad dressings (oil and vinegar, some commercial salad dressings – check labels)
- Nuts (some nuts are higher in carbohydrates than others, and all nuts should be eaten in very small amounts. Ex: 10 small pistachios = 1 gram carbohydrate, 10 cashew nuts = 5 grams carbohydrate)
- Tea
- Atkins Products – Advantage Bars, flour, shakes

Remember to read food labels carefully, to be a discerning shopper and to test foods at restaurants if you are unsure what their sugar/carbohydrate content is. **Controlling your blood glucose will be the key to a long, healthy life.**

References:

- Bernstein MD, Richard K. Dr Bernstein's Diabetes Solution, A Complete Guide to Achieving Normal Blood Sugars. (Boston: Little, Brown and Company), 1997.
- Gordon Medical Arts Center. Diabetes Mastery. (Gordon Medical), 2000.