

What Is Diabetes?

Diabetes is a condition that affects how the body turns sugar into energy.

Type 1

The body makes little or no insulin. This is due to the body's immune system attacking its own pancreas.

Type 2

The body does not use insulin properly, which is called insulin resistance. Or it may not make enough insulin.

When you eat, your body turns some of the food into sugar, or glucose, which then enters the bloodstream.



Glucose fuels your body much as gasoline fuels a car. However, gasoline alone is not enough to make a car run; a **key** is needed to turn on the motor. Only when a car is on can the gasoline be used.



In our bodies, glucose alone is not enough to produce energy; we need a key that allows glucose to enter the cells. This key is called **insulin**.

How do you get diabetes?

Type 1

- Genes (carry the traits we get from our parents).
- Your body may see insulin as a foreign substance that must be destroyed.
 - This is also called autoimmunity.
- Some environmental factors such as foods and toxins.
- Viral infections.



Type 2

- Genes - African Americans, American Indians, Hispanics, and some Asian Americans are more likely to develop type 2 diabetes.
- Physical inactivity and obesity.
- The liver may also release too much glucose.
 - The liver stores excess glucose to release between meals. In people with type 2 diabetes, the liver can release extra, unneeded glucose.

What does all this mean for me?

When glucose stays in the blood and can't get into the cells, you may feel weak and have low energy. Over time, high blood sugar can cause the walls of your arteries to stiffen and become damaged. This can cause damage to your heart, kidneys, nerves and eyes.

3 ways to lower blood sugar

1. Choose vegetables, fruits and whole-grain foods instead of simple carbohydrates. Simple carbohydrates are things like cakes, cookies, pretzels, chips, white bread and white rice.
2. Increase physical activity! Exercise gets your muscles to take up more of the sugar circulating in your bloodstream and use it for energy.
3. Take medications that lower blood sugar. Medications can help glucose enter the cells, prevent the release of glucose by the liver or increase insulin release from the pancreas.

Or if you prefer videos:

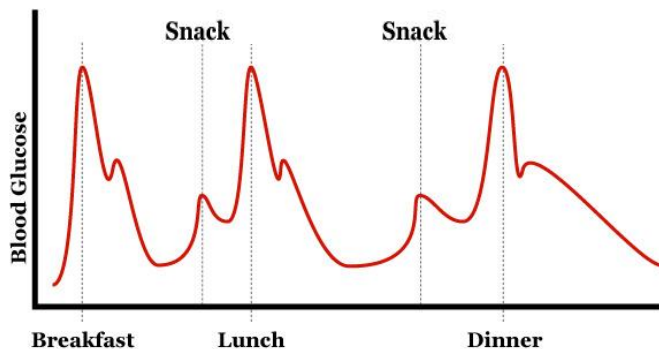


Ep 1. What is diabetes? | *The Diabetes Download*
<https://www.youtube.com/watch?v=MYNZJb5s-OY>

What is diabetes? How does diabetes affect the body? | *Diabetes UK*
<https://www.youtube.com/watch?v=jHRfDTqPzj4>

Monitoring Blood Sugar

Blood sugar (glucose) normally rises and falls throughout the day.



Reasons for rising

- Carbohydrates in meals or snacks
- Stress
- Sickness
- Inactivity
- Not enough diabetes medications

Reasons for falling

- Eating less or skipping a meal
- Exercise
- Drinking alcohol on an empty stomach
- Diabetes medications

Ideal blood glucose levels*

Fasting (before breakfast): 80–130
1–2 hours after a meal: <180

**Your diabetes care team will help you determine your personal blood glucose and A1c levels.*

Why test your blood glucose at home?

- To understand the effects of diet, exercise, illness, stress and diabetes medications
- To identify when it's too high or too low



How do you test your blood glucose?

It's easy! You'll receive instructions from the clinic nurse. In general, it's important to:

- Use only test strips designed for your meter.
- Use test strips that have not expired.
- Clean your meter and check accuracy regularly.
- Bring your meter to doctor appointments.

What about the A1c test?

The A1c test measures your average blood sugar level for the past 2–3 months.

- Ideally, if you're under the age of 65 your A1c should be <7%*.
- Your A1c should be tested by your doctor every 3 months if it's high. If it's within the target range, your doctor should check it every 6 months.



What to do with your results

If blood sugar is too high, take your medications. Or get some exercise such as going for a walk. To prevent high blood sugar in the future, try eating fewer refined carbohydrates. And if you are overweight, lose 5–10% of your weight. If blood sugar is too low, follow the Rule of 15 below. Contact your doctor if your blood sugar is frequently too high or too low.

Rule of 15

If your blood sugar is less than 80, eat 15g of carbohydrates such as:

- 1 tbsp of sugar/honey **OR** 4oz of juice **OR** 8oz of regular soda **OR** 5 regular lifesavers

Test blood sugar 15 minutes later. If it's above 80, have a snack with some protein.

- If it's below 80 repeat "Rule of 15" one more time. If still below 80, call 911.

Or if you prefer videos:

Ep. 3: Diabetes by the Numbers | *The Diabetes Download*

<https://www.youtube.com/watch?v=KjFwNn1yzFY>



What May Be Keeping You from Your A1c Goal | *The Diabetes Download*

<https://www.youtube.com/watch?v=0Cn1PE7Of3U>

Meal Planning

Choose balanced meals and snacks to keep your blood sugar under control.

Which foods raise my blood sugar the most?

Foods that contain **carbohydrates**:

- Grains like rice, oatmeal and barley
- Grain-based foods like bread, cereal, pasta and crackers
- Starchy vegetables like potatoes, peas, and corn
- Fruit and juice
- Milk and yogurt
- Dried beans like pinto beans and soy products like veggie burgers
- Sweets like candy, cakes and cookies
- Snack foods like chips, popcorn and pretzels
- Sweetened beverages

Which foods can help me to balance my blood sugar?

Foods that contain **protein**:

- Chicken, fish and eggs
- Cheese
- Nuts, seeds and nut butters
- Tofu and soymilk (unsweetened)
- Milk and yogurt (contain both protein and carbohydrates)

Foods that contain **fiber**:

- Fruits and vegetables
- Whole grains
- Dried beans (contain fiber, protein and carbohydrates)

Foods that contain **healthy fats**:

- Fish and seafood
- Olive oil and olives
- Avocado

How to balance your meals

1. Draw a line down the middle of your plate. Fill one half with vegetables.
2. Cut the other half in two parts. Fill one part with grains and/or starchy foods. Fill the other part with protein.
3. Add a serving of fruit or dairy. Or both if your meal allows.



Should I stop eating carbohydrates?

No! Carbohydrates are an important source of energy, especially for your brain and nervous system. Foods that contain carbohydrates also have important nutrients. These include fiber, B vitamins, calcium and vitamin C. To control blood sugar, follow these carbohydrate recommendations:

- **Women:** 30–45g per meal; 15–20g per snack
- **Men:** 45–60g per meal; 15–20g per snack

What 15g of carbohydrates looks like:



1 slice of bread



1 small piece of fruit



$\frac{1}{3}$ cup cooked rice



$\frac{1}{2}$ cup peas, corn or potatoes



$\frac{3}{4}$ oz chips or pretzels

Or if you prefer videos:

Diabetes Diet 1:5 – Carbohydrate Counting | *Mission Dietitian*

<https://www.youtube.com/watch?v=1lDew7-xdyo>



Diabetes Diet 2:5 – Serving Sizes | *Mission Dietitian*

<https://www.youtube.com/watch?v=oBqUD9JXm48>

Surprising Facts About Food | *The Diabetes Download*

<https://www.youtube.com/watch?v=ITXaL8NKmYo>

Diabetes and Exercise

Exercise can lower blood sugar and blood pressure. It also can boost heart health. It may even allow you to take lower doses of medications. It does this by improving your body's use of insulin.

How much exercise do I need?

Aerobic exercise

Aim for at least 150 minutes per week; spread it out over 5 days. Splitting your activity into small chunks during the day may make it easier. All sorts of activities count such as walking, running, biking and playing tennis.

Strength training

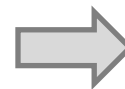
Aim to lift weights or practice weight resistance training 2–3 times per week. You can do strength training activities such as push-ups and squats. Or try yoga or Pilates. Or use free weights and resistance bands.

You don't need to join a gym to exercise. Many of the activities listed above can be done at home. Activities of daily living can also help lower blood sugar. Examples of these are gardening, cleaning your home and walking while shopping.

How does exercise help lower blood sugar?



Muscle cells pull glucose directly from the bloodstream. They do this without needing insulin.



Blood sugars are lowered "naturally." There is a decreased need for insulin.

Other Benefits to Exercise

Exercise improves blood sugar. It also helps us sleep better at night and improves depression. Exercise prevents bone loss and improves blood pressure and cholesterol. It also helps prevent some cancers and many other diseases. However you exercise, make it fun and pick activities you enjoy!

Or if you prefer videos:



23 and ½ hours: What is the single best thing we can do for our health? | *DocMikeEvans*

<https://www.youtube.com/watch?v=aUaInS6HIGo>

Type 2 Diabetes and Exercise | *BoehringerUS*

https://www.youtube.com/watch?v=JCqPBpl6_mU

Diabetes Medications

Meal planning and exercise help manage blood sugar. But sometimes medications are needed to keep your A1c at your target goal. The two main types of diabetes medications are:

Pills taken by mouth

Metformin

- Reduces the amount of sugar the liver releases
- Helps improve the body's ability to respond to insulin
- **Side effects:** Can cause upset stomach

Sulfonylureas (*glimepiride, glyburide, glipizide*)

- Helps the beta cells in the pancreas release insulin
- **Side effects:** Increased risk for low blood sugar and weight gain

Thiazolidinediones or TZDs (*pioglitazone, rosiglitazone*)

- Helps insulin work better in muscle and fat
- Improves the body's response to insulin
- **Side effects:** Can cause weight gain

DPP-4 inhibitors (*sitagliptin, saxagliptin, linagliptin*)

- Prevents the breakdown of GLP-1
 - *The body's natural GLP-1 helps to lower blood sugar levels but is broken down very quickly*

SGLT2 inhibitors (*dapagliflozin, empagliflozin, canagliflozin*)

- Prevents the kidneys from reabsorbing sugar, leaving it in the urine
- **Side effects:** May cause dehydration, genitourinary yeast infections and UTIs

Injectable medications

Non-insulin injectables (*byetta, victoza*)

- Helps beta cells release more insulin when food is in the stomach and intestines
- Stops the liver from releasing sugar in the blood when not needed
- Slows the movement of food through the stomach so sugar enters the blood more slowly
- Increases feelings of fullness
- **Side effects:** Can cause nausea and diarrhea

Insulin*

- Works like a key, unlocking the doors of the cells in your body to let blood sugar in
 - *Insulin is a hormone that the body makes naturally. In people with type 1 diabetes, the beta cells in the pancreas stop making insulin. In type 2 diabetes, the beta cells may stop working over time.*
- There are different types of insulin; they each work at a different pace to mimic the way the body normally releases insulin:
 - Long acting (basal)
 - Fast acting (for meal time)
 - Mixed (twice a day for simplicity)
- **Side effects:** Can cause weight gain; redness, swelling or itching at injection site; and low blood sugar

**Your diabetes care team will decide which type of insulin is best for you. Each person is different. So it may take a while to find the correct type and dose.*

Why do my diabetes medications keep changing?

For most people with type 2 diabetes, blood sugar levels increase over time. Different medications are needed at different stages. And insulin may be required if oral medications stop working. Your diabetes care team will work with you. They want to make sure you have the right medications. Remember: diabetes medications won't cure diabetes, but they can help manage it.

Or if you prefer a video:



Ep. 5: Diabetes Treatment Options | *The Diabetes Download*
<https://www.youtube.com/watch?v=VIfwuN5j2QI>

Managing Your Diabetes

Remember your ABCs

A1c

Ideally, if you're under age 65, your A1c should be **<7%**. If your A1c is high, it should be tested by your doctor every 3 months. If it's within the target range, it should be tested every 6 months.

Blood pressure

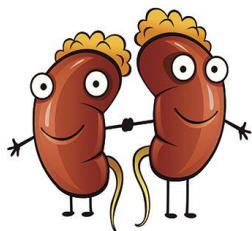
People with diabetes have higher rates of heart attack and stroke. So it's important to manage your blood pressure to help reduce your risk. If you have diabetes, your goal is **<140/90**.

Cholesterol

High cholesterol can increase your risk of heart disease. If you have diabetes, your goals are:

- LDL (bad cholesterol): **<100**
- HDL (good cholesterol):
Men: **>40** Women: **>50**
- Triglycerides: **<150**

Other things to keep in mind



Kidneys

People with diabetes are at risk for kidney disease. Your doctor can do a urine test which checks for kidney failure. Keeping your blood sugar in good control is the best way to keep your kidneys healthy.



Eyes

High blood sugar can cause changes to the shape of the retina and damage to tiny blood vessels. Eye exams are important to reduce the risk of damage to your vision. Blurry vision is often a side effect of high blood sugar.



Vaccines

People with diabetes have a higher risk of infection. It's recommended that you get an annual flu shot. Also, get a pneumonia shot once before age 65. Get another after age 65. Keep at least 5 years between the two shots.

Mental health

A diagnosis of diabetes can be overwhelming. So can living with diabetes. As you take care of yourself, you may feel sad, scared or frustrated. You may also feel isolated or angry. However, there are resources to help you work through these feelings and live your best life. If your feelings are keeping you from managing your diabetes, talk with your doctor.

And don't forget your feet!

High blood sugar can change the nerves and small blood vessels in your feet. This can lead to decreased sensation, or increased sensation in the form of a burning feeling. Have your doctor check your feet at each visit; if an exam isn't offered, take off your shoes and socks and ask for one. Make sure to take regular care of your feet by following these guidelines:

- Always wear shoes when walking or standing, even at home.
- Check the bottom of your feet daily for any odd coloring. Look for bleeding, bruising, cuts and blisters. Watch for redness, swelling or nail problems.
- Break in new shoes gradually; wear them for only a few hours the first few days.
- Never use hot water bottles or heating pads on your feet.

Or if you prefer videos:

ABCs of Diabetes | *DocMikeEvans*

<https://www.youtube.com/watch?v=MUb0nywugug>



Emotional Side of Diabetes | *The Diabetes Download*

<https://www.youtube.com/watch?v=dYe6J9KXXK8>

5 Steps to Diabetic Foot Care | *Mayo Clinic*

<https://www.youtube.com/watch?v=SuINOSMMNLY>

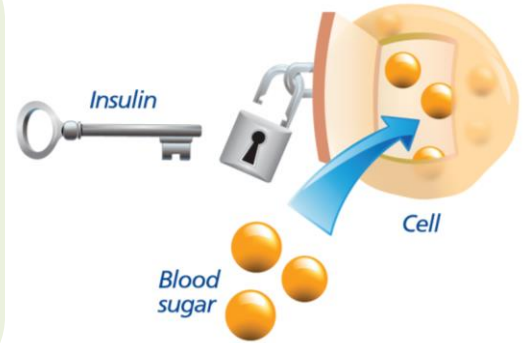
Insulin

What is insulin?

Insulin is a hormone made by your pancreas. It helps sugar move from your blood into your cells, where it is used as energy.

Sugar from food makes your blood sugar level go up. This then causes the pancreas to release more insulin. If your pancreas doesn't produce enough insulin on its own, you'll need insulin injections.

Insulin can't be taken as a pill because it's a protein. It will be broken down in your stomach just like regular food.



Types of insulin

Insulin Type	How it Works	Common Names
Long-acting	Keeps blood sugar stable overnight and between meals. Typically injected once per day.	<i>Lantus, Levemir, Toujeo, Tresiba</i>
Intermediate-acting	Keeps blood sugar stable overnight and between meals. Typically injected once or twice per day.	<i>Humulin N, Novolin N</i>
Short-acting	Mealtime insulin taken 30 minutes before a meal to "cover" carbohydrates consumed.	<i>Humulin R, Novolin R</i>
Fast-acting	Mealtime insulin taken right before a meal.	<i>Humalog, NovoLog, Apidra</i>
Pre-mixed	Intermediate-acting insulin mixed with short -or fast-acting insulin	<i>Humulin 70/30, Humulin 50/50, NovoLog Mix 70/30</i>

What if I miss a dose?

Long-acting

If it's been less than 4 hours, you can give yourself the full dose. After 4 hours, it's time for some math: Divide the number of hours it's been by 24. Then multiply this number by your normal insulin dose. The result is how many units you should give yourself.

Intermediate-acting

If it's been less than 4 hours, you can give yourself the full dose. After 4 hours, skip that dose and use fast-acting to balance out any blood sugar spikes.

Fast-acting

If it's been within 1 hour of eating, give yourself the full dose; between 1–2 hours, use 75%; between 2–3 hours, use 50%. Remember to plan for future meals too. If you eat again in an hour, you may need a snack to balance out glucose and insulin.

Any side effects?

You may get **low blood sugar** if you take too much insulin, don't eat enough or are more active than usual. You can also have **redness, swelling or itching at the injection site**. Let your diabetes care team know if you experience any of these symptoms. Changing to a different insulin may solve the problem.

Or if you prefer videos:



Advances in Insulin | *The Diabetes Download*

<https://www.youtube.com/watch?v=rJImBxi7BSc>

Insulin Pen Teaching | *Shared Care Free Clinic*

https://www.youtube.com/watch?v=PFtxU_OTNpQ