

# Glucose Tolerance Test

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Glucose tolerance tests help to diagnose type 2 diabetes or impaired glucose tolerance - a condition that may lead to diabetes.

**Note:** the information below is a general guide only. The arrangements, and the way tests are performed, may vary between different hospitals. Always follow the instructions given by your doctor or local hospital.

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## What is a glucose tolerance test?

A glucose tolerance test checks how well the body processes glucose (sugar). It involves comparing the levels of glucose in the blood before and after drinking a sugary drink. The results of this test can help doctors to detect [type 2 diabetes](#) or [impaired glucose tolerance](#).

## Understanding blood glucose and insulin

After you eat, various foods are broken down in your gut into sugars. The main sugar is called glucose which passes through your gut wall into your bloodstream. However, to remain healthy, your blood glucose level should not go too high or too low.

So, when your blood glucose level begins to rise (after you eat), the level of a hormone called insulin should also rise. Insulin works on the cells of your body and makes them take in glucose from the bloodstream. This decreases the amount of glucose left in the blood. Some of the glucose is used by the cells for energy, and some is converted into glycogen or fat (which are stores of energy). When the blood glucose level begins to fall (between meals), the level of insulin falls. Some glycogen or fat is then converted back into glucose which is released from the cells into the bloodstream.

Insulin is a hormone that is made by cells called beta cells. These are part of little 'islands' of cells (islets) within the pancreas. Hormones are chemicals that are released into the bloodstream and work on various parts of the body.

## What is type 2 diabetes?

With type 2 diabetes, the illness and symptoms tend to develop gradually (over weeks or months). This is because in type 2 diabetes you still make insulin (unlike [type 1 diabetes](#)). However, you develop diabetes because:

- you do not make enough insulin for your body's needs, OR
- the cells in your body do not use insulin properly. This is called 'insulin resistance'. The cells in your body become resistant to normal levels of insulin. This means that you need more insulin than you normally make to keep the blood glucose level down; OR
- a combination of the above two reasons.

## How does a glucose tolerance test work?

In most people a simple blood test is enough to detect diabetes. However, some people have 'borderline' results on routine blood tests and then a glucose tolerance test may help. Also, a glucose tolerance test can show when the body can't manage blood glucose levels well but not yet to the stage of diabetes. This is known as 'impaired glucose tolerance' (sometimes called pre-diabetes) and is a condition that can lead to diabetes.

In healthy people, glucose (sugar) levels in the blood always rise after a meal, but they soon return to normal as the glucose is used up or stored. A glucose tolerance test helps to distinguish between this normal pattern and the patterns seen in diabetes and impaired glucose tolerance.

Prior to a glucose tolerance test you are asked not to eat for a certain length of time before the test. Then you drink a sugary drink. Normally, the body should quickly move glucose from the blood into the body's cells. This would reduce the amount of glucose found in the blood samples taken. If there is a problem moving glucose into the cells, glucose remains in the bloodstream. This shows as a higher level of glucose in the blood samples.

When the results of the blood samples come back, doctors compare the level of glucose found in your blood samples taken after the test with specific values. These values can determine if you have diabetes or impaired glucose tolerance.

## What happens during a glucose tolerance test?

For the days leading up to the test you should eat a normal diet without restricting what you eat. The night before the test your doctor may ask you to stop eating 8-12 hours before you are due to have the test. You will usually be allowed to drink water, but may be asked to avoid sugary drinks.

On the morning of the test your doctor or nurse will take a sample of blood before the test begins. This is known as the fasting sample; it provides a comparison for the other test results. To do this you may have a small needle placed into a vein in the back of your hand.

You will then be given a drink which contains a particular amount of sugar (in the form of glucose) and water.

Timings may vary but another blood sample will be taken 1-2 hours after you have had the drink. In some cases more samples may be taken.

After the blood samples are taken, the needle in the back of your hand is removed and you can leave.

## What should I do to prepare for a glucose tolerance test?

Your doctor should give you advice about what to do to prepare for a glucose tolerance test. This may include information about how long to fast for before having the test.

## Are there any side-effects or complications from a glucose tolerance test?

There are usually no side-effects from a glucose tolerance test apart from a small bruise which may appear at the place where the needle was inserted. Rarely, the vein used to take the blood may become swollen; this usually settles within a few days.

## Further reading & references

- [Definition and Diagnosis of Diabetes Mellitus and Intermediate Hyperglycaemia](#); World Health Organization/International Diabetes Federation, 2006
- [Management of diabetes](#); Scottish Intercollegiate Guidelines Network - SIGN (March 2010)
- [Barr RG, Nathan DM, Meigs JB, et al; Tests of glycemia for the diagnosis of type 2 diabetes mellitus. Ann Intern Med. 2002 Aug 20;137\(4\):263-72.](#)
- [Diabetes UK](#)

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