

What is insulin resistance?

Insulin resistance happens when cells in your muscles, fat and liver don't respond to insulin as they should. This is also known as impaired insulin sensitivity. Insulin is essential for life and regulating blood glucose (sugar) levels

Insulin helps move glucose from your blood into your cells so your body can use it for energy. For several reasons, your cells can respond inappropriately to insulin. This means they can't efficiently use the glucose for energy or for storage. As a result, glucose continues to build up in your blood. Your pancreas makes more insulin to try to overcome your increasing blood glucose levels. This is called hyperinsulinemia

As long as your pancreas can make enough insulin to balance out your blood sugar levels, they'll stay in a healthy range. If your cells become too resistant to insulin, it leads to elevated blood glucose levels (hyperglycemia)

Over time, hyperglycemia can lead to prediabetes and Type 2 diabetes

The condition is also associated with

Obesity

Cardiovascular disease

Metabolic dysfunction-associated steatotic liver disease

Metabolic syndrome

Polycystic ovary syndrome (PCOS), formerly known as PMOS

Who does insulin resistance affect

Insulin resistance can affect anyone — you don't have to have diabetes — and it can be temporary (for example, using steroid medication for a brief period causes insulin resistance) or chronic. The two main factors that seem to contribute to insulin resistance are excess body fat, especially around your belly, and a lack of physical activity

Having a family history of insulin resistance (family members with prediabetes, type 2 diabetes, and/or PCOS) can also contribute to insulin resistance

People who have prediabetes and Type 2 diabetes usually have insulin resistance.

People with Type 1 diabetes can also experience insulin resistance

Symptoms and Causes

Signs of insulin resistance can include skin tags, discolored patches of skin or
.changes to your weight

?What are the symptoms of insulin resistance

If you have insulin resistance, but your pancreas can increase insulin production to
.keep your blood sugar levels in range, you won't have any symptoms

But over time, the condition can get worse, and the cells in your pancreas that make
insulin can wear out. Eventually, your pancreas can't produce enough insulin to
.overcome it, leading to elevated blood sugar

People with consistently high blood sugar levels can experience the following
:symptoms

Unexplained weight loss

Fatigue

Increased thirst

(Frequent urination (peeing

Increased hunger

Blurred vision

Yeast infections

Many people have no symptoms of prediabetes, often for years. Prediabetes may be
invisible until it develops into Type 2 diabetes. Some people with prediabetes may
:experience the following symptoms

Darkened skin in your armpit or back and sides of your neck, called acanthosis
nigricans

Skin tags

Eye changes that can lead to diabetes-related retinopathy

If you're experiencing any of these symptoms, it's important to see your healthcare
.provider

?What causes insulin resistance

Scientists still have a lot to discover about how exactly it develops. So far, they've
identified several genes that make a person more or less likely to develop insulin
resistance. Providers also know that gaining weight can worsen it, and losing weight

can help improve it. Other factors and conditions can cause varying degrees of the condition

Acquired causes of insulin resistance

:Acquired causes of the condition, meaning you're not born with the cause, include

Excess body fat: Scientists believe obesity is a primary cause of insulin resistance. Excess fat in your belly and around your organs (visceral fat) especially raises your risk

Physical inactivity: Movement and exercise make your body more sensitive to insulin. Exercise also builds muscle that can absorb blood glucose. A lack of physical activity can lead to the condition

Food choices: A diet of highly processed foods, high in carbohydrates and saturated fats, has been linked to the condition

Certain medications: Steroids, blood pressure medications, HIV treatments and other medications can cause insulin resistance

Hormonal disorders that can cause insulin resistance

Issues with certain hormones can affect how well your body uses insulin. Hormonal disorders that can cause insulin resistance include

Cushing's syndrome: This rare condition happens when there's extra cortisol in your body. Excess cortisol can counteract the effects of insulin, causing the condition

Acromegaly: This is a very rare but serious condition that happens when you have high levels of growth hormone (GH). High levels of GH can lead to insulin resistance

Hypothyroidism: This means your thyroid is underactive and doesn't produce enough thyroid hormone. It causes your metabolism to slow down, which can lead to insulin resistance

Genetic conditions that cause insulin resistance

Certain inherited genetic disorders — conditions you're born with — can cause the condition for various reasons. These are rare but include Type A insulin resistance syndrome and Donohue syndrome

:Other inherited conditions that can cause it include

Myotonic dystrophy: This is a form of muscular dystrophy that affects your muscles, eyes and endocrine system organs

Alström syndrome: This condition causes obesity and Type 2 diabetes. It also causes .vision and hearing loss, dilated cardiomyopathy and short stature

Werner syndrome: A condition that causes accelerated aging (progeria). It affects .many aspects of your body, including resistance to the effects of insulin

Inherited lipodystrophy: This is a condition in which your body doesn't use and store .fat properly

Diagnosis and Tests

?How is insulin resistance diagnosed

Insulin resistance is difficult to diagnose because there isn't routine testing for it. As long as your pancreas is producing enough insulin to overcome the resistance, you .won't have any symptoms

Your healthcare provider will consider several factors when evaluating you for the :condition. These might include your

Medical history

Family history

Physical exam

Signs and symptoms

?What tests will be done to evaluate insulin resistance

Your healthcare provider may order the following blood tests to diagnose the :condition

Glucose test. A fasting plasma glucose (FPG) or a blood glucose test can screen for .prediabetes, type 2 diabetes or gestational diabetes

A1c test. This test reveals your average blood glucose levels over the past three .months

.Lipid panel. This is a group of tests that measure specific lipids in your blood

Management and Treatment

?How is insulin resistance treated

Not all factors that contribute to the condition can be treated, such as genetic factors and age. For this reason, lifestyle modifications are the primary treatment for :insulin resistance. Lifestyle modifications include

Eating nutritious foods. Your healthcare provider may recommend reducing carbohydrates and unhealthy fats. That might mean eating less sugar, red meats and processed starches. Instead, they'll likely recommend eating more whole foods, like vegetables, fruits and whole grains. For protein, they might suggest more fish and .lean poultry

Physical activity. Getting regular amounts of moderate-intensity physical activity can .help. It helps increase glucose energy usage and improves muscle insulin sensitivity

Losing excess weight. In some cases, losing weight can improve insulin resistance. .Your healthcare provider can suggest strategies for weight loss

:Over time, these lifestyle modifications can

Reduce insulin resistance

Lower your blood glucose levels

Decrease blood pressure

Decrease triglyceride and LDL ("bad") cholesterol levels

Raise HDL ("good") cholesterol levels

Your healthcare provider might refer you to a specialist, like a dietitian or endocrinologist. They'll work together with you to come up with an individualized .treatment plan

?What medications are used to treat insulin resistance

There are currently no medications that treat the condition specifically. Your healthcare provider may prescribe medications to treat coexisting conditions. Some :examples include

Blood pressure medication

Metformin for diabetes or prediabetes

Statins to lower LDL cholesterol

?Can I reverse insulin resistance

The condition has several causes and contributing factors, and not all causes are reversible. But lifestyle changes can make a difference. Eating nutritious foods, exercising regularly and losing excess weight may decrease your insulin resistance. .Talk to your healthcare provider about what you can do to best manage it

?How can diet affect insulin resistance

What you eat can have a big impact on your blood sugar and insulin levels. The glycemic index (GI) is a tool that can help you determine what foods have the .biggest impact on your blood sugar levels

High-GI foods generally have a lot of carbohydrates and/or sugar. They cause your blood sugar to increase quickly and require a lot of insulin to bring blood sugar back down. You'll want to avoid high-sugar drinks like regular soda and juices, and avoid :eating excess amounts of the following foods

White bread

Potatoes

Breakfast cereals

Cakes and cookies

Fruits such as watermelon and dates

Low-GI foods cause a steadier rise in blood sugar. Your pancreas doesn't have to work as hard to release insulin. Eating foods that are lower on the glycemic index is :generally better for people with insulin resistance

Beans and legumes

Fruits such as apples and berries

Non-starchy vegetables, such as asparagus, cauliflower and leafy greens

Nuts

Dairy, fish and meat

Always talk to your healthcare provider before making extreme changes to your .eating patterns

Outlook / Prognosis

?What is the prognosis (outlook) for insulin resistance

If you have the condition, ask your healthcare provider about what you can expect .and how best to manage it

:What you can expect depends on several factors, including

The cause of insulin resistance

The severity of insulin resistance

How well you and your healthcare provider can manage the condition

People can have mild insulin resistance that never turns into prediabetes or Type 2 diabetes. People can also have insulin resistance that's reversible or manageable .with lifestyle changes

?What are the complications of insulin resistance

Complications can occur when the condition isn't managed. Possible complications :include

Type 2 diabetes

Metabolic syndrome

Heart disease

Not everyone who has insulin resistance will have complications. If you've been diagnosed with it, it's important to try to prevent these complications. Be sure to .see your healthcare provider regularly and follow your treatment plan

Prevention

?What are the risk factors for developing insulin resistance

Certain genetic and lifestyle risk factors make it more likely that you'll develop :insulin resistance or prediabetes. Risk factors include

Having overweight or obesity, especially excess fat around your belly

Being age 45 or older

A first-degree relative (biological parent or sibling) with diabetes

Being sedentary

Certain health conditions, such as high blood pressure and high cholesterol levels

A history of gestational diabetes

A history of heart disease or stroke

Having a sleeping disorder, such as sleep apnea

Smoking

:You may have a higher risk of developing it if you are

Black

Hispanic/Latino

Asian

Middle Eastern

You can't change certain risk factors for insulin resistance, such as family history or age. But you can try lowering your chances of developing it by maintaining a healthy weight for you and exercising regularly

Living With

?When should I see my healthcare provider about insulin resistance

If you've been diagnosed with the condition, it's important to see your healthcare provider regularly. They'll check to make sure your blood sugar levels are in a healthy range and that your treatment is working

If you're experiencing symptoms of high blood sugar or prediabetes, contact your healthcare provider. They can run simple tests to check your blood sugar levels

If you have a family history of diabetes or insulin resistance, talk to your healthcare provider about your risk of developing it

?What questions should I ask my doctor

If you receive a diagnosis, it may be helpful to ask your healthcare provider the following questions

?What's causing my insulin resistance

?What's my risk of developing prediabetes or Type 2 diabetes

?Is there any medication I can take

?Should I see a specialist for the condition

A note from Cleveland Clinic

Insulin resistance is a complex condition that can affect your health in several ways. It doesn't have any symptoms until it turns into prediabetes or Type 2 diabetes. The best thing you can do is try to prevent or reverse it by maintaining a healthy weight, exercising regularly and eating nutritious foods. Unfortunately, though, not all causes of the condition are preventable or treatable. If you have any questions about your risk of developing insulin, talk to your healthcare provider. They're there to help you