



UNDERSTANDING
INSULIN
RESISTANCE

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UNDERSTANDING INSULIN RESISTANCE

Insulin resistance is a condition in which the body's cells become less responsive to insulin, a hormone produced by the pancreas that helps regulate blood sugar levels. When cells are resistant to insulin, glucose builds up in the bloodstream, leading to higher blood sugar levels. Over time, insulin resistance can contribute to the development of type 2 diabetes and other health issues.

What is Insulin Resistance & How Does it Develop?

Insulin is a hormone that helps cells absorb glucose from the bloodstream to use as energy. Insulin resistance occurs when cells become less sensitive to insulin, causing higher levels of glucose in the blood. When you eat carbohydrates, your digestive system breaks them down into glucose, which enters the bloodstream. In response to rising blood sugar levels after a meal, the pancreas releases insulin into the bloodstream. Insulin acts like a key, unlocking cells' doors to allow glucose to enter and be used for energy or stored for future use.

Over time, factors such as a sedentary lifestyle, excessive calorie intake, and genetics can lead to changes in cells' response to insulin. The exact mechanisms are complex, but it's believed that inflammatory processes, oxidative stress, and altered signalling pathways contribute to insulin resistance. As a result, cells become less sensitive to insulin's signals, requiring higher levels of insulin to achieve the same glucose uptake.

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WHAT ARE THE SYMPTOMS OF INSULIN RESISTANCE?

Insulin resistance can develop gradually over time, and its symptoms may not always be immediately apparent. However, certain signs and symptoms can indicate the presence of insulin resistance or its potential progression to more serious conditions like type 2 diabetes.

High Blood Sugar Levels (Hyperglycemia):

Elevated fasting blood sugar levels (typically measured after an overnight fast) may indicate insulin resistance. Postprandial (after-meal) blood sugar spikes can also occur due to impaired insulin function, leading to fluctuating energy levels and mood swings.

Increased Hunger and Thirst:

Insulin resistance can disrupt the body's ability to regulate appetite and hunger cues. Individuals with insulin resistance may experience frequent hunger, especially after meals, and increased thirst due to elevated blood sugar levels.

Fatigue and Low Energy Levels:

Despite consuming adequate calories, people with insulin resistance may feel fatigued, sluggish, and have low energy levels throughout the day. Fluctuations in blood sugar levels can contribute to feelings of tiredness and reduced physical endurance.

Difficulty Losing Weight or Weight Gain:

Insulin resistance can make it challenging to lose weight, particularly around the abdomen (central obesity). Weight gain, especially in the abdominal area, may occur due to insulin's role in promoting fat storage in adipose tissue.

Skin Changes:

Dark patches of skin, known as acanthosis nigricans, may develop in areas such as the neck, armpits, groin, and other skin folds. Acanthosis nigricans is associated with insulin resistance and may indicate an increased risk of developing type 2 diabetes.

Hormonal Imbalances:

Women with insulin resistance, particularly those with polycystic ovary syndrome (PCOS), may experience irregular menstrual cycles, infertility, and elevated levels of male hormones (androgens). Hormonal imbalances can contribute to symptoms such as acne, excess facial or body hair (hirsutism), and hair loss.

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Sleep Disturbances:

Insulin resistance has been linked to sleep disorders such as obstructive sleep apnea (OSA) and poor sleep quality. Sleep disturbances can further exacerbate insulin resistance and metabolic dysfunction.

Digestive Issues:

Some individuals with insulin resistance may experience digestive symptoms such as bloating, gas, constipation, or diarrhea. These symptoms may be related to impaired gut function and changes in gut microbiota composition.

Mood Changes and Mental Health:

Fluctuations in blood sugar levels can affect mood stability and cognitive function. Individuals with insulin resistance may experience mood swings, irritability, anxiety, or depression.

Increased Risk of Other Health Conditions:

Insulin resistance is a key risk factor for developing type 2 diabetes, cardiovascular disease, hypertension (high blood pressure), dyslipidemia (abnormal cholesterol levels), and non-alcoholic fatty liver disease (NAFLD).

It's important to note that not everyone with insulin resistance will experience all of these symptoms, and some individuals may remain asymptomatic until complications develop.

Regular health screenings, including blood glucose tests and metabolic assessments, are essential for early detection and management of insulin resistance and associated health risks.



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WHAT ARE THE CAUSES OF INSULIN RESISTANCE?

Insulin resistance is a complex metabolic condition influenced by a combination of genetic, lifestyle, and environmental factors. Understanding the various causes of insulin resistance can help individuals make informed choices to manage and prevent this condition.

Genetic Factors:

Genetic predisposition plays a significant role in insulin resistance. Some individuals may inherit genes that affect insulin sensitivity and glucose metabolism. Family history of type 2 diabetes or insulin resistance can increase the risk of developing insulin resistance.

Obesity and Body Composition:

Excess body weight, particularly abdominal or visceral fat, is strongly associated with insulin resistance. Adipose tissue (fat cells) secretes hormones and cytokines that can interfere with insulin signaling and glucose uptake by cells.

Sedentary Lifestyle:

Lack of regular physical activity and a sedentary lifestyle are major contributors to insulin resistance. Exercise helps improve insulin sensitivity by enhancing glucose uptake in muscles and promoting overall metabolic health.

Poor Diet:

Over consumption of high-calorie, high-sugar, and high-fat foods can contribute to insulin resistance. Diets high in refined carbohydrates, sugary beverages, saturated fats, and processed foods can lead to elevated blood sugar levels and insulin resistance.

Insulin Overproduction:

In some cases, the pancreas may produce excess insulin in response to chronic high carbohydrate intake or insulin resistance itself. Continuous high insulin levels can desensitize cells to insulin's effects, leading to insulin resistance.

Hormonal Imbalances:

Hormonal disorders such as polycystic ovary syndrome (PCOS) are associated with insulin resistance. Hormonal imbalances, particularly elevated levels of androgens (male hormones) in women with PCOS, can contribute to insulin resistance.

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Chronic Inflammation:

Chronic low-grade inflammation in the body, often associated with obesity and unhealthy diet patterns, can impair insulin signaling pathways. Inflammatory cytokines and adipokines released by adipose tissue can interfere with insulin action and promote insulin resistance.

Sleep Disorders and Stress:

Poor sleep quality, sleep deprivation, and sleep disorders like sleep apnea have been linked to insulin resistance. Chronic stress and elevated cortisol levels can also contribute to insulin resistance by affecting glucose metabolism and insulin sensitivity.

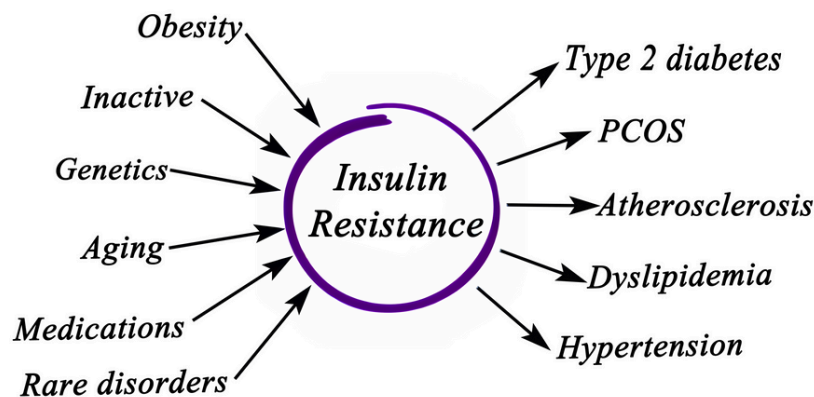
Medications and Medical Conditions:

Certain medications, such as corticosteroids, antipsychotics, and some HIV medications, can induce insulin resistance as a side effect.

Medical conditions such as hypertension, dyslipidemia (abnormal cholesterol levels), and fatty liver disease are often associated with insulin resistance.

Age and Ethnicity:

Aging is associated with a decline in insulin sensitivity, although lifestyle factors play a significant role. Certain ethnic groups, such as African Americans, Hispanics, Native Americans, and Pacific Islanders, have a higher prevalence of insulin resistance and type 2 diabetes.



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HOW IS INSULIN RESISTANCE DIAGNOSED?

Diagnosing insulin resistance involves a combination of medical history evaluation, physical examinations, and several key tests. The goal is to assess how well your body processes glucose and to identify any abnormalities that might indicate insulin resistance or its progression to type 2 diabetes.

Medical History and Physical Examination

The initial step in diagnosing insulin resistance often involves a thorough medical history review and physical examination. Healthcare providers may look for risk factors such as obesity, especially increased abdominal fat; a family history of diabetes; hypertension; and signs of conditions associated with insulin resistance like polycystic ovary syndrome (PCOS) in women.

A1C Test

The A1C test, also known as the hemoglobin A1c, HbA1c, is a key diagnostic tool for insulin resistance and diabetes. It measures the average blood glucose levels over the past 2 to 3 months by assessing the percentage of hemoglobin proteins in the blood that are coated with sugar (glycated hemoglobin).

ALTHOUGH THE A1C TEST IS A CRITICAL INSTRUMENT FOR EVALUATING METABOLIC HEALTH, HAVING A "NORMAL" A1C RESULT DOES NOT GUARANTEE THE ABSENCE OF INSULIN RESISTANCE. IT'S POSSIBLE FOR AN INDIVIDUAL TO EXHIBIT NORMAL A1C LEVELS WHILE STILL EXPERIENCING MILD OR SEVERE INSULIN RESISTANCE.

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Other Tests

Lipid Profile: This test measures cholesterol and triglyceride levels, which can be abnormal in insulin resistance.

Insulin Level: Fasting insulin tests are less commonly used but can indicate how much insulin your body is producing, suggesting insulin resistance if levels are high.

Diagnosing insulin resistance requires a comprehensive approach that includes evaluating medical history, physical exams, and several tests, with the A1C test playing a crucial role in assessing long-term glucose control. Identifying insulin resistance early is vital for implementing lifestyle changes and interventions to reduce the risk of developing type 2 diabetes and other associated conditions.

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SUPPLEMENT SUPPORT FOR INSULIN RESISTANCE

Berberine HCl

- Increases glucose uptake, improves insulin sensitivity, reduces glucose production by the liver, modulates gut microbiome and has anti-inflammatory effects.

Myo-Inositol

- Clinical studies have shown that supplementation with myo-inositol can lead to improvements in insulin sensitivity, menstrual regularity, ovulatory function, and fertility outcomes in women with PCOS. While research is still unclear about the benefits of myo-inositol in the absence of PCOS, it may be a useful tool for patients without PCOS.

Vitamin D3

- Contributes to reducing insulin resistance by improving insulin sensitivity, regulating pancreatic function, reducing inflammation, supporting muscle health, and maintaining calcium balance.

Alpha Lipoic Acid

- Supports insulin resistance by improving insulin sensitivity, increasing glucose uptake by cells, regulating glucose transporters, acting as an antioxidant, regenerating other antioxidants, and exerting anti-inflammatory effects.

*Supplements should only be used when prescribed by a qualified health professional.

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SUPPORTS FOR INSULIN RESISTANCE

NUTRITION

- Focus meals around high quality protein (animal and plant sources) and veggies, adding in carbohydrates last.
- Have snacks that contain protein, fat and fibre
- Eat protein for breakfast
- Follow the Glucose Goddess Method of eating
- Reduce portion size

LIFESTYLE

- Move your body for 10-15 mins within 60 minutes of eating. This fires up your muscles, which can use glucose without the need for insulin.
- Optimize your sleep and get tested for sleep disorders (like sleep apnea) if indicated. Aim for 7-8 hours nightly of high quality sleep.
- Reduce stress and cortisol
- Perform intentional movement (exercise) 4-5 times weekly for 30-45 min. Limit high intensity movement and opt for gentle movement and strength training. Frequent high intensity can increase stress and promote insulin resistance.

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