

Metabolic Diseases

Rick Fox

M.A

Health and Wellness
Specialist



Metabolic Diseases

- Metabolism is the process your body uses to get or make energy from the food you eat. Food is made up of proteins, carbohydrates and fats.

Metabolic Diseases

- Chemicals in your digestive system break the food parts down into sugars and acids, your body's fuel. Your body can use this fuel right away, or it can store the energy in your body tissues, such as your liver, muscles and body fat.

Problem

- A metabolic disorder occurs when abnormal chemical reactions in your body disrupt this process. When this happens, you might have too much of some substances or too little of other ones that you need to stay healthy.

Problem

- You can develop a metabolic disorder when some organs, such as your liver or pancreas, become diseased or do not function normally. Diabetes is an example.

What is Diabetes?

- The term "diabetes" refers to a number of diseases, the most common being type 1 diabetes, type 2 diabetes, and gestational diabetes.
- In each, the body does not produce or properly use insulin — a hormone that is needed to convert sugar starches and other food into the energy we need to live.

Diabetes

- The exact causes of diabetes are still unclear, although both genetics and environmental or lifestyle factors can play an important role in the development of diabetes and its complications.

Diabetes and How It Affects You

- Nearly 24 million adults and children in the U.S. have been diagnosed with diabetes. Another 57 million people have pre-diabetes, a condition that increases their risk for developing type 2 diabetes.

Pre-diabetes

- This is a condition that occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of type 2 diabetes.

Type 1 Diabetes

- Type 1 diabetes is usually diagnosed in children and young adults, and was previously known as juvenile diabetes.

Type 1 diabetes

- The body fails to produce insulin, the hormone that "unlocks" the cells of the body, allowing glucose (sugar) to enter and fuel them. People who have type 1 diabetes must take insulin daily to survive

Type 1 Diabetes

- In type 1 diabetes, the body does not produce insulin. Insulin is a hormone that is needed to convert sugar, starches and other food into energy needed for daily life.
- Only 5-10% of people with diabetes have this form of the disease

Type 1 Diabetes

- With the help of insulin therapy and other treatments, even young children with type 1 diabetes can learn to manage their condition and live long, healthy, happy lives.

Type 2 Diabetes

- Type 2 diabetes is the most common form of diabetes. Millions of Americans have been diagnosed with type 2 diabetes, and many more are unaware they are at high risk.

Type 2 diabetes

- It develops when the body cannot produce or properly use insulin. Older people (and minorities) carry the highest risk for type 2, but a growing number of children and young adults are now being diagnosed with it.

Type 2 Diabetes

- Some groups have a higher risk for developing type 2 diabetes than others.
- Type 2 diabetes is more common in African Americans, Latinos, Native Americans, and Asian Americans, Native Hawaiians and other Pacific Islanders as well as the aged population.

Type 2 Diabetes

- In type 2 diabetes, either the body does not produce enough insulin or the cells ignore the insulin.

Type 2 Diabetes

- Insulin is necessary for the body to be able to use glucose for energy. When you eat food, the body breaks down all of the sugars and starches into glucose, which is the basic fuel for the cells in the body.

Type 2 Diabetes

- Insulin takes the sugar from the blood into the cells. When glucose builds up in the blood instead of going into cells, it can lead to diabetes complications.

What is Gestational Diabetes?

- Pregnant women who have never had diabetes before but who have high blood sugar (glucose) levels during pregnancy are said to have gestational diabetes.

Gestational diabetes

- This type of diabetes occurs during pregnancy and then usually goes away after the baby is born. It's very important to treat gestational diabetes because it can harm the developing fetus. Mothers who experience gestational diabetes are also at greatly increased risk for developing type 2 diabetes later in life.

Gestational Diabetes

- During pregnancy -- usually at around 28 weeks or later -- many women are diagnosed with gestational diabetes. A diagnosis of gestational diabetes doesn't mean that you had diabetes before you conceived, or that you will have diabetes after giving birth.

Gestational Diabetes

- But it's important to follow your doctor's advice regarding blood glucose (blood sugar) levels while you're planning your pregnancy, so you and your baby both remain healthy.

Gestational Diabetes

- Gestational diabetes affects about 4% of all pregnant women - about 135,000 cases of gestational diabetes in the United States each year.

What Causes Gestational Diabetes?

- The placenta supports the baby as it grows. Hormones from the placenta help the baby develop.
- But these hormones also block the action of the mother's insulin in her body.

What Causes Gestational Diabetes?

- This problem is called insulin resistance. Insulin resistance makes it hard for the mother's body to use insulin. She may need up to three times as much insulin.

What Causes Gestational Diabetes?

- Gestational diabetes starts when your body is not able to make and use all the insulin it needs for pregnancy.
- Without enough insulin, glucose cannot leave the blood and be changed to energy. Glucose builds up in the blood to high levels. This is called hyperglycemia.

Effects on Baby

- When you have gestational diabetes, your pancreas works overtime to produce insulin, but the insulin does not lower your blood glucose levels.
- Although insulin does not cross the placenta, glucose and other nutrients do.

Effects on Baby

- So extra blood glucose goes through the placenta, giving the baby high blood glucose levels. This causes the baby's pancreas to make extra insulin to get rid of the blood glucose. Since the baby is getting more energy than it needs to grow and develop, the extra energy is stored as fat.

Effects on Baby

- This can lead to macrosomia, or a "fat" baby. Babies with macrosomia face health problems of their own, including damage to their shoulders during birth.
- Because of the extra insulin made by the baby's pancreas, newborns may have very low blood glucose levels at birth and are also at higher risk for breathing problems.

Diabetes and Being Overweight?

- Being overweight is a leading risk factor for developing type 2 diabetes and makes treating diabetes more difficult. Studies show that overweight people who lose as little as 10-15 pounds and exercise just 30 minutes a day 5 times a week reduced their risk of developing diabetes by almost 60%.

Warning Signs/Symptoms of Diabetes

- Unusual thirst
- Frequent desire to urinate
- Blurred vision
- Tired feeling for no apparent reason
- Extreme hunger
- Irritability
- Tingling/numbness in the hands or feet

What is the metabolic syndrome?

- The metabolic syndrome is characterized by a group of metabolic risk factors in one person. They include:

Risk Factors

- Abdominal obesity (excessive fat tissue in and around the abdomen)
- Atherogenic dyslipidemia (blood fat disorders — high triglycerides, low HDL cholesterol and high LDL cholesterol — that foster plaque buildups in artery walls)

Risk Factors

- Elevated blood pressure
- Insulin resistance or glucose intolerance (the body can't properly use insulin or blood sugar)

Risk Factors

- Prothrombotic state (e.g., high fibrinogen or plasminogen activator inhibitor–1 in the blood)
- Proinflammatory state (e.g., elevated C-reactive protein in the blood)

Risk Factors

- People with the metabolic syndrome are at increased risk of coronary heart disease and other diseases related to plaque buildups in artery walls (e.g., stroke and peripheral vascular disease) and type 2 diabetes. The metabolic syndrome has become increasingly common in the United States.

Risk Factors

- The dominant underlying risk factors for this syndrome appear to be abdominal obesity and insulin resistance. Insulin resistance is a generalized metabolic disorder, in which the body can't use insulin efficiently.

Diagnosed?

- The American Heart Association and the National Heart, Lung, and Blood Institute recommend that the metabolic syndrome be identified as the presence of three or more of these components:

Diagnosed?

- Elevated waist circumference:
Men — Equal to or greater than 40 inches
(102 cm)
Women — Equal to or greater than 35 inches
(88 cm)

Diagnosed?

- Elevated triglycerides:
Equal to or greater than 150 mg/dL

Diagnosed?

- Reduced HDL (“good”) cholesterol:
Men — Less than 40 mg/dL
Women — Less than 50 mg/dL

Diagnosed?

- Elevated blood pressure:
Equal to or greater than 130/85 mm Hg

Diagnosed?

- Elevated fasting glucose:
Equal to or greater than 100 mg/dL

AHA Recommendation for Managing the Metabolic Syndrome:

- Reduce the risk for cardiovascular disease and type 2 diabetes.
- Reduce the major risk factors for cardiovascular disease: stop smoking and reduce LDL cholesterol, blood pressure and glucose levels to the recommended levels

Long and Short term risk management

- Weight loss to achieve a desirable weight (BMI less than 25 kg/m²)

Long and Short term risk management

- Increased physical activity, with a goal of at least 30 minutes of moderate-intensity activity on most days of the week

Long and Short term risk management

Healthy eating habits that include reduced intake of saturated fat, trans fat and cholesterol