

Diabetes and its complications



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Diabetes mellitus (DM) is a set of related diseases in which the body cannot regulate the amount of sugar (specifically, glucose) in the blood. The blood delivers glucose to provide the body with energy to perform all of a person's daily activities. The liver converts the food a person eats into glucose. The glucose is then released into the bloodstream. In a healthy person, the blood glucose level is regulated by several hormones, primarily insulin. Insulin is produced by the pancreas, a small organ between the stomach and liver.

The pancreas also makes other important enzymes released directly into the gut that help digest food. Insulin allows glucose to move out of the blood into cells throughout the body where it is used for fuel. People with diabetes either do not produce enough insulin (type 1 diabetes) or cannot use insulin properly (type 2 diabetes), or both (which occurs with several forms of diabetes). In diabetes, glucose in the blood cannot move efficiently into cells, so blood glucose levels remain high.

This not only starves all the cells that need the glucose for fuel, but also harms certain organs and tissues exposed to the high glucose levels.

Type 1 diabetes (T1D): The body stops producing insulin or produces too little insulin to regulate blood glucose level. Type 1 diabetes involves about 10% of all people with diabetes in the United States. Type 1 diabetes is typically diagnosed during childhood or adolescence. It used to be referred to as juvenile-onset diabetes or insulin-dependent diabetes mellitus. Type 1 diabetes can occur in an older individual due to destruction of the pancreas by alcohol, disease, or removal by surgery. It also results from progressive failure of the pancreatic beta cells, the only cell type that

produces significant amounts of insulin. People with type 1 diabetes require insulin treatment daily to sustain life.

Type 2 diabetes (T2D): Although the pancreas still secretes insulin, the body of someone with type 2 diabetes is partially or completely unable to use this insulin. This is sometimes referred to as insulin resistance.

The pancreas tries to overcome this resistance by secreting more and more insulin. People with insulin resistance develop type 2 diabetes when they fail to secrete enough insulin to cope with their higher demands. At least 90% of adult individuals with diabetes have type 2 diabetes.

Type 2 diabetes is typically diagnosed in adulthood, usually after age 45 years. It used to be called adult-onset diabetes mellitus, or non-insulin-dependent diabetes mellitus. These names are no longer used because type 2 diabetes does occur in younger people, and some people with type 2 diabetes require insulin therapy. Type 2 diabetes is usually controlled with diet, weight loss, exercise, and oral medications. However, more than half of all people with type 2 diabetes require insulin to control their blood sugar levels at some point in the course of their illness. Gestational diabetes (GDM) is a form of diabetes that occurs during the second half of pregnancy.

Although gestational diabetes typically resolves after delivery of the baby, a woman who develops gestational diabetes is more likely than other women to develop type 2 diabetes later in life. Women with gestational diabetes are more likely to have large babies. Metabolic syndrome (also referred to as syndrome X) is a set of abnormalities in which insulin-resistant diabetes (type 2 diabetes) is almost always present along with hypertension (high blood pressure), high fat levels in the blood (increased serum lipids, <https://assignbuster.com/diabetes-and-its-complications/>

predominant elevation of LDL cholesterol, decreased HDL cholesterol, and elevated triglycerides), centralobesity, and abnormalities in blood clotting and inflammatory responses.

A high rate of cardiovascular disease is associated with metabolic syndrome. Prediabetes is a common condition related to diabetes. In people with prediabetes, the blood sugar level is higher than normal but not yet high enough to be considered diagnostic of diabetes. Prediabetes increases a person's risk of developing type 2 diabetes, heart disease, or stroke. Prediabetes can typically be reversed (without insulin or medication) with lifestyle changes such as losing a modest amount of weight and increasing physical activity levels.

Weight loss can prevent, or at least delay, the onset of type 2 diabetes. An international expert committee of the American Diabetes Association redefined the criteria for prediabetes, lowering the blood sugar level cut-off point for prediabetes. Approximately 20% more adults are now believed to have this condition and may develop diabetes within 10 years if they do not make lifestyle changes such as exercising more and maintaining a healthy weight. About 17 million Americans (6.2% of adults in North America) are believed to have diabetes.

It has been estimated that about one third of adults with diabetes do not know they have diabetes. About 1 million new cases of diabetes are diagnosed each year, and diabetes is the direct or indirect cause of at least 200,000 deaths each year. The incidence of diabetes is increasing rapidly. This increase is due to many factors, but the most significant are the increasing incidence of obesity associated with the prevalence of a sedentary lifestyle.

Complications of Diabetes

Both type 1 and type 2 diabetes ultimately lead to high blood sugar levels, a condition called hyperglycemia.

- Over a long period of time, hyperglycemia damages the retina of the eye, the blood vessels of the kidneys, the nerves, and other blood vessels.
- Damage to the retina from diabetes (diabetic retinopathy) is a leading cause of blindness.
- Damage to the kidneys from diabetes (diabetic nephropathy) is a leading cause of kidney failure.
- Damage to the nerves from diabetes (diabetic neuropathy) is a leading cause of foot wounds and ulcers, which frequently lead to foot and leg amputations.
- Damage to the nerves in the autonomic nervous system can lead to paralysis of the stomach (gastroparesis), chronic diarrhea, and an inability to control heart rate and blood pressure during postural changes.
- Diabetes accelerates atherosclerosis, (the formation of fatty plaques inside the arteries), which can lead to blockages or a clot (thrombus). Such changes can then lead to heart attack, stroke, and decreased circulation in the arms and legs (peripheral vascular disease).
- Diabetes predisposes people to elevated blood pressure, high levels of cholesterol and triglycerides. These conditions both independently and together with hyperglycemia, increase the risk of heart disease, kidney

disease, and other blood vessel complications. Diabetes can contribute to a number of acute (short-lived) medical problems.

Many infections are associated with diabetes, and infections are frequently more dangerous in someone with diabetes because the body's normal ability to fight infections is impaired. To compound the problem, infections may worsen glucose control, which further delays recovery from infection. Hypoglycemia or low blood sugar, occurs intermittently in most people with diabetes. It can result from taking too much diabetes medication or insulin (sometimes called an insulin reaction), missing a meal, exercising more than usual, drinking too much alcohol, or taking certain medications for other conditions. It is very important to recognize hypoglycemia and be prepared to treat it at all times. Headache, feeling dizzy, poor concentration, tremor of the hands, and sweating are common symptoms of hypoglycemia. A person can faint or have a seizure if blood sugar level become too low.

Diabetic ketoacidosis (DKA) is a serious condition in which uncontrolled hyperglycemia (usually due to complete lack of insulin or a relative deficiency of insulin) over time creates a buildup of ketones (acidic waste products) in the blood. High levels of ketones can be very harmful. This typically happens to people with type 1 diabetes who do not have good blood glucose control. Diabetic ketoacidosis can be precipitated by infection, stress, trauma, missing medications like insulin, or medical emergencies such as a stroke and heart attack. Hyperosmolar hyperglycemic nonketotic syndrome is a serious condition in which the blood sugar level gets very high. The body tries to get rid of the excess blood sugar by eliminating it in the urine. This increases the amount of urine significantly, and often leads to

dehydration so severe that it can cause seizures, coma, and even death. This syndrome typically occurs in people with type 2 diabetes who are not controlling their blood sugar levels, who have become dehydrated, or who have stress, injury, stroke, or are taking certain medications, like steroids.