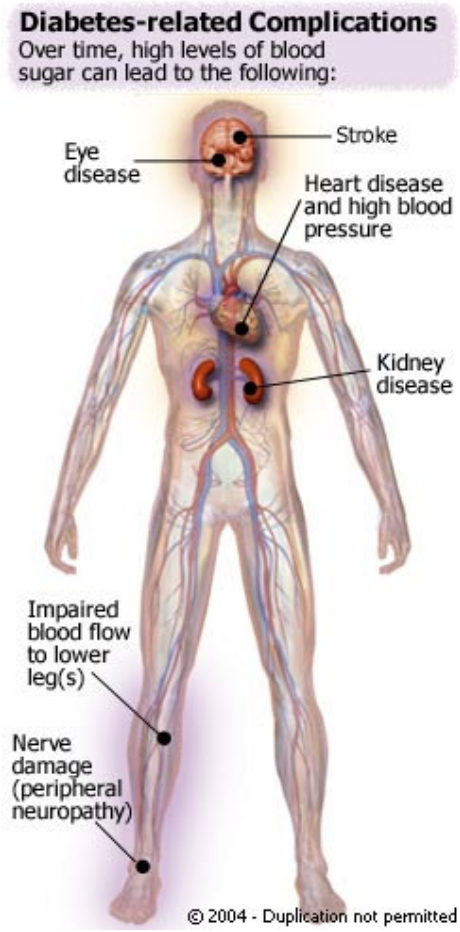
CONSEQUENCES OF DIABETES

Summary

Diabetes is a disorder of the metabolism. People with diabetes are unable to process glucose, a form of sugar derived from the foods we eat. Under normal circumstances, a hormone called insulin enables glucose to pass from the bloodstream into the cells, where it used as the body's main form of energy. In a diabetic, however, the body either produces little or no insulin, or the cells are unable to use the insulin that is produced.

This causes elevated levels of blood sugar, which can lead to a variety of symptoms (e.g., blurred vision, fatigue, unusual thirst) in the short-term and serious consequences such as **heart attack** or **stroke** in the long-term. Other long-term consequences include permanent damage to the eyes, **kidneys**, feet, nerves and **blood vessels**. A potentially fatal condition called *ketoacidosis* may also develop, in which the blood becomes increasingly acidic as toxic substances build up in the bloodstream.



Treatment for diabetes aims to keep the level of blood glucose within the normal range through blood monitoring, diet and exercise, and insulin therapy. In some cases, however, the blood sugar level may become too low. This is called **hypoglycemia** and can lead to a variety of symptoms, including sweating and **dizziness**. Severely low levels may also lead to shaking and/or **fainting**, which can be very frightening to both the patient and people around him or her.

Although all people can be mildly hypoglycemic after not eating for several hours, diabetics can experience more severe hypoglycemia in a variety of common situations. These situations include:

- Skipping a meal or snack
- Doing unexpected exercise (e.g., running across campus after waking up late)
- Taking too much insulin

To avoid serious consequences of low blood sugar levels, diabetics are encouraged to carry high-sugar foods or glucose-rich drinks such as orange juice with them at all times.

About high blood sugar

High blood sugar levels result in the following symptoms of **diabetes**:

- Excessive urination
- Increased thirst or hunger
- Slow-to-heal infections, especially in the feet
- Unexplained weight loss
- Excessive fatigue
- Itching
- Blurred vision
- Nausea and/or abdominal pain
- Acetone-like breath (similar to the smell of nail polish remover)
- Low **blood pressure** (**hypotension**)

Untreated, diabetes can lead to a potentially fatal condition called *ketoacidosis*. Ketoacidosis is the result of the body's breaking down fats into substances called *ketones*, which gradually build up in the bloodstream in the absence of enough insulin. This build-up causes the blood to become increasingly acidic, which could lead to either coma or death. Ketoacidosis is a more common complication in **type 1 diabetes**, when injury, infection or missing a treatment can provoke symptoms.

Individuals with type 2 diabetes, which accounts for about 90 percent of all cases, may have a buildup of ketones, but usually without the degree of acidosis found in type 1. Symptoms in type 2 are typically due to skipped meals as well as low insulin levels brought on by uncontrolled *hyperglycemia* (elevated blood sugar levels).

Diabetics need to get immediate medical attention if they experience warning signs of ketoacidosis, which include the following:

- Frequent urination
- Nausea and vomiting
- Extreme thirst
- Slow, deep breathing
- Abdominal pain (especially in children)
- Feeling very tired or weak

About diabetes and heart health

Untreated diabetes may affect nearly every part of the body, including the cardiovascular system, **kidneys**, nerves and **blood vessels**. Diabetes has been linked to **atherosclerosis** (hardening of the arteries), which is a leading contributor to heart disease. As a result, major organs of the body may not get enough oxygen-rich blood. Young women with **type 1 diabetes** are especially vulnerable to heart disease compared to male diabetics.

Studies have also shown that poorly controlled type 1 diabetes is associated with **calcification**, a process in which plaque grows progressively harder and more brittle. Calcification occurs when calcium deposits in the blood attach to **cholesterol** deposits on the walls of arteries.

All of these changes contribute to conditions such as the following:

- **Coronary artery disease**. Restricted blood flow due to narrowed or partially blocked **coronary arteries**.
- **Peripheral arterial disease**. Restricted blood flow due to narrowed or partially blocked **peripheral arteries**.
- **Cardiomyopathy**. Restricted blood flow due to inflammation of the heart muscle.

There is also a higher risk among type 2 diabetics for developing kidney disease within the first ten years after diagnosis.

For all of these reasons, **heart attacks** and **stroke** are more common in diabetics than in the general population. About 65 percent of deaths among people with diabetes are attributed to heart disease and stroke, and even this number may be low because of underreporting.

Some studies have found that even a moderate insulin deficiency indicates a higher risk of heart disease. Research also shows a higher likelihood of **congenital heart defects** (e.g., **transposition of the great arteries**, **truncus arteriosus** and **tricuspid atresia**) in babies born to diabetic mothers.

About low blood sugar

Hypoglycemia is the medical term for low blood sugar levels. A diabetic may suffer from hypoglycemia if they skip meals or if their insulin therapy is not correct. Severe cases of hypoglycemia can lead to **fainting** and shaking, which is often frightening for both the patient and people around him or her. Other symptoms of hypoglycemia include the following:

- Sweating
- Nervousness
- Hunger
- **Dizziness**
- Paleness
- Headache
- Numb or tingling lips
- Feeling shaky

In general, people can get mild hypoglycemia if they have not eaten for several hours. However, those with diabetes may experience more severe hypoglycemia in a variety of situations, which include the following:

- Skipping a meal or snack
- Doing unexpected **exercise** (e.g., running across campus after waking up late)
- Taking too much medication

Because even slightly high insulin can lead to hypoglycemia, diabetics are advised to carry any of the following with them at all times:

- Hard candies
- Fresh orange
- Fruit juice, especially orange juice
- Regular soda
- Sugar packets