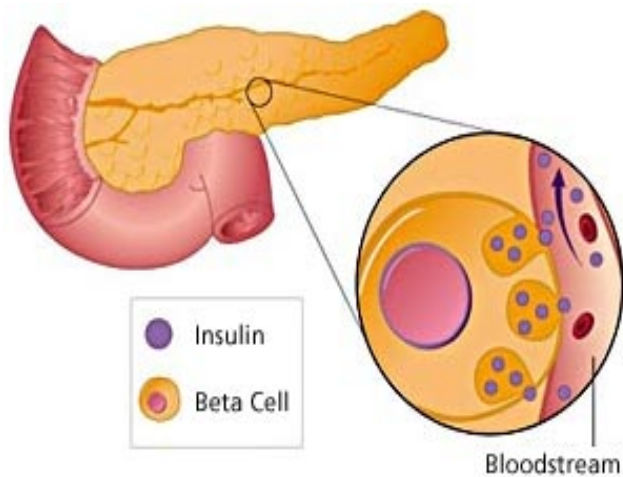


Type 1 Diabetes



Insulin cannot be taken in a pill form through the mouth. If it were to be consumed this way, it would be broken down during digestion just like normal proteins in your food. Insulin must be injected into the fat under the skin in order for it to get into the bloodstream.



Overview

Type 1 Diabetes (DM) is usually diagnosed in children and young adults. It was previously referred to as "Juvenile Diabetes." In this type of diabetes, the body is not able to produce insulin. Insulin is required by the body to use sugar, in the form of glucose. Glucose is the basic fuel for cells. Insulin's role is to take the glucose from the blood and carry it into cells where it can be used to provide energy for the body to do work.

About Insulin

Insulin is a hormone made by the beta cells of the pancreas. With each meal consumed, beta cells release insulin in order for the body to be able to use or store the glucose it gets from foods. With Type 1 Diabetics, however, the pancreas is no longer able to make insulin. The beta cells have been destroyed. Insulin shots are thus required in order for the body to use the glucose coming from meals.



Characteristics of Insulin

There are **three** characteristics of insulin:

- **Onset:** is the length of time before insulin reaches the bloodstream and begins lowering blood glucose.
- **Peaktime:** is the time during which insulin is at maximum strength in being able to lower blood glucose.
- **Duration:** is how long insulin continues to lower blood glucose.



The Four Types

- | | |
|---|--|
| <ul style="list-style-type: none"> • Rapid-acting insulin • Regular or short-acting insulin | <ul style="list-style-type: none"> • Intermediate-acting insulin • Long-acting insulin |
|---|--|

Rapid-acting

- **Onset:** Begins to work in about 5 minutes
- **Peaktime:** Peak is about 1 hour
- **Duration:** Continues to work for about 2-4 hours

Regular/short-acting

- **Onset:** Reaches the bloodstream within 30 minutes after injection
- **Peaktime:** Peaks anywhere from 2-3 hours after injection
- **Duration:** Effective for approximately 3-6 hours

Intermediate-acting

- **Onset:** Reaches the bloodstream about 2-4 hours after injection
- **Peaktime:** Peaks 4-12 hours later
- **Duration:** Effective for about 12 to 18 hours

Long-acting

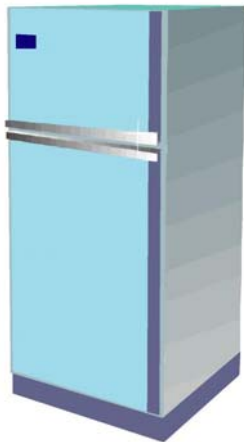
- **Onset:** Reaches the bloodstream 6-10 hours after injection
- **Duration:** Usually effective for 20-24 hours
- There is also a very long-acting insulin, known as glargine, which starts to lower blood glucose levels about one hour after injection and keeps working evenly for 24 hours after injection.

Premixed Insulin

Premixed insulin is also an option for individuals with Type 1 Diabetes. It is helpful for individuals who have trouble drawing up insulin out of two bottles or for individuals who have difficulty in reading the correct directions and dosages.

Information on Storage of Insulin

- Manufacturers recommend storing insulin in the refrigerator; however, injecting cold insulin sometimes makes the injection more painful.
- You can store insulin to be used immediately at room temperature.
- Insulin stored at room temperature will last for approximately 1 month.
- If purchasing several bottles at once, keep one at room temperature to be used immediately. Store the remaining bottles in the refrigerator so that they will keep longer.



Fine-Tuning Blood Glucose levels

There are many factors that influence blood glucose levels, including:

- What you eat
- How much and when you exercise
- Where you inject your insulin
- When you take your insulin injections
- Illness
- Stress



Information on Storage of Insulin

- Do not store insulin near extreme heat or extreme cold.
- Never store in the freezer, direct sunlight, or in the glove compartment of a car.
- Check the expiration date. This is especially important for a larger batch.
- Make sure that the insulin looks normal before drawing it into the syringe.
- If there is any discoloration, particles, "frosting" or crystals in the solution, do not use it. Return the unopened bottle to a pharmacy for an exchange and/or refund.

CAUTION!

Conditions that can arise from Type 1 DM

- Hypoglycemia
- Hyperglycemia
- Ketoacidosis



—HYPOGLYCEMIA—

Hypoglycemia is a condition that occurs due to low blood glucose. It happens from time to time in everyone with diabetes. It is sometimes referred to as an "insulin reaction." It must always be treated immediately.



- Establish a schedule for checking blood glucose levels as directed by a physician.
- Blood glucose should be checked if there are any symptoms of hypoglycemia present.
- The presence of low blood glucose level requires immediate treatment.
- If you are unable to check your blood glucose, a good rule of thumb is: **"When in doubt, treat"**

Treatment Should Be Immediate

If hypoglycemia is not treated immediately, it can result in a loss of consciousness. Loss of consciousness requires immediate treatment such as injection of glucagon or emergency treatment at the hospital. Glucagon, like insulin, is injected but serves a different purpose. Glucagon helps to raise blood glucose levels. A physician can prescribe glucagon and give directions on its use.

Symptoms of Hypoglycemia

- Shakiness
- Dizziness
- Sweating
- Hunger
- Pale skin color
- Sudden moodiness or behavior changes, such as crying for no apparent reason
- Clumsy or jerky movements
- Seizure
- Difficulty paying attention or confusion
- Tingling sensations around the mouth



How to Treat Hypoglycemia

The fastest way to raise blood glucose and treat hypoglycemia is with some form of sugar. Any of the following would work:

- 3 glucose tablets
- 1/2 cup of fruit juice
- 5-6 pieces of hard candy

—HYPERGLYCEMIA—

Hyperglycemia is a technical term for high blood glucose. It can be a serious problem if not treated. Hyperglycemia can happen when the body has too little, or not enough insulin, or when the body is not able to use insulin properly.



Blood glucose levels can be reduced by exercising.

However, if the blood glucose level is above 240 mg/dl, check the urine for ketones. If there are ketones present, then exercise is not recommended.

In addition, cutting down on the amount of food may help.

If exercise and changes in diet do not help, then talk with a physician about either changing the amount of insulin or the timing of the injections.

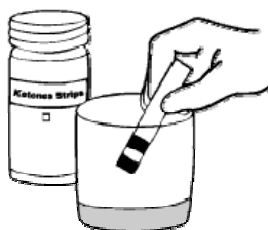
Potential Causes of Hyperglycemia

- Eating more than planned
- Exercising less than planned
- Stress of an illness, such as the cold or flu
- Other stresses, such as family conflicts or dating problems

Ketones are acids that build up in the blood. They appear in the urine when the body doesn't have enough insulin. Ketones can poison the body. They are an indicator that the diabetes is getting out of control. Ketones are present in high amounts in a condition known as Ketoacidosis.

—KETOACIDOSIS—

Ketoacidosis results from a failure to treat hyperglycemia. It rarely occurs in individuals with Type 2 DM. It is a very serious condition that can lead to diabetic coma, or even death. Treatment for this condition usually takes place in a hospital. You can prevent the condition by learning what the warning signs are and by checking your blood and urine regularly.



Potential Causes of Hypoglycemia

- Thirst or a very dry mouth
- Frequent urination
- High blood glucose levels
- High levels of ketones in the urine
- Constantly feeling tired
- Dry or flushed skin
- Nausea, vomiting, or abdominal pain
- Shortness of breath
- Difficulty paying attention

Possible Causes of Ketoacidosis

- **Not getting enough insulin:** The dose was not enough or perhaps the body needed more insulin than usual because of illness. Without sufficient insulin, the body begins to break down fat for energy.
- **Not enough food:** During illness, appetite and food intake is reduced and this may result in high ketone levels. Skipping meals can also lead to ketoacidosis.
- **An insulin reaction:** When blood glucose levels fall too low, the body must use fat for energy. If testing shows high ketones in the morning, its likely that the person may have had an insulin reaction while asleep.

Ketoacidosis is dangerous and serious. If you have any of the mentioned symptoms, contact your health care provider immediately or go to the nearest emergency room. An important note: **NEVER** exercise when urine test shows ketones and the blood glucose is high. This combination can mean that the diabetes is out of control.

Who Should Check?

The ADA recommends blood glucose checks if you have diabetes and are:

- Taking insulin or diabetes pills
- On intensive insulin therapy
- Pregnant
- Having a hard time controlling your blood glucose levels
- Having severe low blood glucose levels or ketones from high blood glucose levels
- Having low blood glucose levels without the usual warning signs

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