

INSULIN

Insulin is a hormone produced by the pancreas and that the body needs to use glucose. In some patients with diabetes, the pancreas does not produce insulin. Other patients do not use insulin effectively and require additional insulin to control their glucose concentrations.

Most people who receive insulin to control diabetes inject the insulin under the skin with a special insulin needle and syringe. Special insulin needles and syringes allow patients to exactly measure the amount of insulin they inject. Currently, other insulin devices for self-administering insulin exist, and other new ones are also being investigated.

Devices currently available

Insulin pens are a convenient way to take insulin with you. An insulin pen is similar to a pen with a cartridge containing 100 to 200 units of insulin. At the tip of the pen, there is a thin, short needle, similar to the insulin syringe needle. A dial on the pen allows for selecting the desired dose of insulin. Once the needle is placed under the skin, the user presses a plunger at the end of the pen to inject the insulin just below the skin. Insulin pens can be helpful for patients who have difficulty seeing or for patients who have difficulty extracting insulin with a syringe and conventional hypodermic needle.

Insulin injectors, which resemble large pens, inject a fine mist of insulin through the skin by means of compressed air. Insulin injectors are expensive, but are an option for patients who have trouble using traditional needles.

External insulin pumps adhere to the body by means of a flexible plastic tube, with a needle inserted just below the skin, generally near the abdomen. Insulin pumps generally are approximately the size of a pack of cards, weight approximately 4 to 6 ounces, and can be worn on a waistband or in a pocket. A rechargeable cartridge in the pump contains enough insulin for 2 days. The needle and the tube must be changed every 2 days. The pump is programmed at a constant dose or the "basal" amount of insulin that is administered can be programmed at different basal amounts. Insulin pumps allow users to inject a bolus (several units at a time) of insulin at meals and at times of the day when blood sugar is too high. It is essential to self-monitor blood glucose frequently to determine the insulin doses and be sure that the right amount of insulin is administered.

Insulin administration methods under development

Implantable insulin pumps are surgically implanted, generally beneath the skin of the abdomen. The pumps are disc-shaped and weigh approximately 6 to 8 ounces. The pump administers a continual dose of insulin throughout the day. A manual telemetric unit tells the pump to administer a specific amount of insulin at mealtime and when the glucose has gone up a lot.

One advantage of this method is that, as with the insulin that the pancreas produces naturally, the pump insulin is administered to the blood stream, where it is transported to the liver, where it regulates its glucose production.

Insulin patches are placed on the skin and administer a reduced continual dose of insulin. To adjust the insulin doses before meals, users can lift a tab on the patch to release insulin. One problem in managing to manufacture an effective patch is that insulin is not easily absorbed by the skin.

Recently, a nose spray was developed for administering insulin. This method of administration allows patient to spray insulin into the nose, where it is absorbed by the mucous membranes. Some patients have had side effects with this method of administration, which may not be effective in all cases.

With the future development of these devices and alternate methods of administration, patients who must receive insulin will have greater ease in controlling their diabetes.