

Insulin

Insulin is produced by special cells in the **pancreas**, a large organ located behind the stomach. Insulin helps the body use and store **glucose** (sugar), which is produced during the digestion of food. Insulin is secreted into the blood at each meal and allows the body to use glucose as energy to fuel basic daily functions like moving and breathing. The January 10, 2007, issue of *JAMA* includes an article about treatment of diabetes. This Patient Page is based on one previously published in the May 7, 2003, issue of *JAMA*.

DIABETES

If there is not enough insulin or if the body cannot use the insulin produced, individuals develop a condition known as **diabetes**. Blood glucose levels can become high. If the body is unable to use glucose, it starts breaking down fats for energy. This produces waste products called **ketones**. High levels of ketones cause a dangerous condition called **ketoacidosis** that requires immediate medical attention. On the other hand, too much insulin can cause **hypoglycemia** (low blood sugar).

There are 2 major types of diabetes. In **type 1 diabetes**, the pancreas does not produce enough insulin. People with type 1 diabetes always need insulin treatment. People with **type 2 diabetes** have what is called **insulin resistance** and eventually cannot make enough insulin to meet their needs. They may start treatment by losing weight with diet and exercise or by taking pills, or they may need insulin treatment right away.

USING INSULIN

Insulin must be delivered to the bloodstream and is usually given by injection. Doctors or nurses teach patients how to inject insulin. Many individuals with diabetes inject insulin under the skin of the belly; others prefer the arm or thigh. Some patients with type 1 diabetes use an insulin “pump” that delivers insulin through a tiny tube placed under the skin.

Individuals with diabetes who need insulin must take it every day. They need insulin all the time to move glucose from the blood into the muscles where it is used, and they need enough insulin to utilize the glucose from food. The dose of insulin for meals depends on the amount of carbohydrates consumed. Blood glucose levels must be measured throughout the day by taking a small drop of blood (usually by a pinprick to the finger) and placing it in a meter that measures the blood glucose level.

FOR MORE INFORMATION

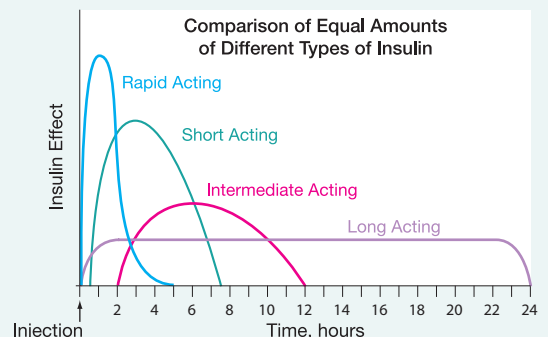
- American Diabetes Association
www.diabetes.org
- National Diabetes Information Clearinghouse
www.niddk.nih.gov/health/diabetes/nidc.htm

INFORM YOURSELF

To find this and previous JAMA Patient Pages, go to the Patient Page Index on JAMA's Web site at www.jama.com. A Patient Page on type 1 diabetes was published in the October 22/29, 2003, issue.

Sources: American Diabetes Association, National Institute of Diabetes and Digestive and Kidney Diseases, American Association of Diabetes Educators

There are several types of insulin, which differ based on how long it takes the insulin to start working after it is injected (**onset**), when the insulin is working hardest (**peak**), and how long the insulin lasts in the body (**duration**). Some individuals with diabetes use different types of insulin in various proportions and combinations depending on the time of day and timing of meals. Your doctor can help you determine the insulin types and schedule that are best for your needs.



Sharon Parmet, MS, Writer

Cassio Lynn, MA, Illustrator

Richard M. Glass, MD, Editor

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