

Diabetes

Diabetes is a disease in which your body has trouble using food for energy.

When you eat, your digestive system breaks food down into smaller parts. These smaller parts -- a variety of nutrients and other things -- are then used to run your body. One of these nutrients, a sugar known as glucose, is a primary source of energy for the body.

In healthy people, glucose enters the bloodstream, moves throughout the body, and enters cells everywhere, where it is burned as fuel. Insulin, a hormone that is produced by a gland called the pancreas, helps the glucose to enter the cells. Normally, when you eat, your body senses just how much glucose is in your bloodstream. Your pancreas then produces just enough insulin to make sure the glucose gets into your cells and is properly used.

If you have diabetes, however, this system is not working correctly. You either have little or no insulin, or you do have insulin but for some reason your cells are not allowing insulin to do its job. In either case, when you eat, glucose is not properly moving from your bloodstream to your cells. It builds up in the blood (high blood sugar), overflows into the urine, and passes out of the body. Your body has lost its main source of fuel, even though the blood contains lots of glucose.

Diabetes is a serious condition. But with proper care, you can help prevent the progression of this disease and greatly reduce your chances of developing complications. Making the decision to learn more about your disease is the first step toward a long and healthy life, so you're already on the right track!

There are three different forms of diabetes: Type 1, Type 2, and gestational diabetes. Nearly 16 million people in the U.S. have diabetes. More than 5 million of them don't know that they have the disease.

A closely related condition is known as impaired glucose metabolism.

Type 1 Diabetes

In Type 1 diabetes, the body produces little or no insulin. People who have this condition need to take injections of insulin every day in order to live. Type 1 diabetes is sometimes called insulin-dependent diabetes or juvenile diabetes.

Type 1 diabetes is an autoimmune disease. That means that the body's system for fighting infection -- the immune system -- has turned against a part of the body. The body is fighting itself. In this case, the immune system has attacked the "beta" cells in the pancreas, which produce insulin. The beta cells are destroyed, and the result is little or no natural insulin in the body. No one knows just why the immune system does this, but scientists believe that both genetic (inherited) factors and outside factors, perhaps viruses, might be involved.

Symptoms of Type 1 diabetes usually arise over a short period of time (although beta cell destruction may have begun years earlier). Symptoms include increased thirst and urination, constant hunger, weight loss, blurred vision, and extreme fatigue. If someone with this condition is not diagnosed and treated promptly with insulin, he or she can lapse into a life-threatening diabetic coma, also known as diabetic ketoacidosis.

Type 1 diabetes accounts for about 5 to 10 percent of all diagnosed diabetes cases in the U.S. It occurs most often in children and young adults, but it can appear at any age. It is somewhat more common in people who have family members who also have the disease.

Type 2 Diabetes

Type 2 diabetes is the most common form of diabetes. About 90 to 95 percent of people with diabetes have this type. It usually develops in people over the age of 40, most commonly in those over 55. In this form of diabetes, the pancreas is usually still producing some insulin, but the body is unable to use the insulin correctly or there is not enough insulin.

In early stages of Type 2 diabetes, the pancreas usually still produces enough insulin. For some unknown reason, however, the body is not able to use the insulin to move glucose into cells, and it builds up in the bloodstream. The body often responds by producing even more insulin. This is a condition called insulin resistance. Because the body is producing extra insulin, blood sugar levels remain close to normal.

Over time, though, the pancreas loses its ability to make so much insulin. This can often take several years. Eventually, the situation is the same as in Type 1 diabetes -- glucose builds up in the blood (high blood sugar) and the body is unable to get it into the cells to use as fuel. Symptoms usually emerge at that time.

The symptoms of Type 2 diabetes develop gradually. They don't arise as suddenly as they do in Type 1 diabetes. Symptoms may include fatigue or nausea, frequent urination, unusual thirst, weight loss, blurred vision, frequent infections, and slow healing of wounds or sores. Some people have no symptoms.

Type 2 diabetes can often be controlled with diet and exercise in the early stages. Some people eventually need medication as well, either oral diabetes pills or insulin injections.

About 80 percent of people with Type 2 diabetes are overweight. Type 2 diabetes is often part of a metabolic syndrome that includes obesity, high blood pressure, and high levels of blood lipids (such as cholesterol). Unfortunately, as more children become overweight, Type 2 diabetes is becoming more common in young people.

Anyone can develop Type 2 diabetes, but it is somewhat more common in African Americans, Hispanic Americans, Native Americans, and people who have a family history of diabetes.

Gestational Diabetes

Gestational diabetes develops only during pregnancy. The condition usually disappears after the baby is born, but women who have had it are then at a higher risk of getting Type 2 diabetes later in life.

Like Type 2 diabetes, gestational diabetes is more common in African Americans, Hispanic Americans, Native Americans, and people who have a family history of diabetes.

Impaired Glucose Metabolism

Impaired glucose metabolism is a condition that is midway between normal and diabetic. Blood sugar levels on certain tests are higher than normal, but not quite high enough to say the person has diabetes. People with this condition are at higher than average risk for developing diabetes, heart attacks, and strokes.

There are two forms of impaired glucose metabolism: Impaired Fasting Glucose (IFG), and Impaired Glucose Tolerance (IGT).

Impaired Fasting Glucose

A person has impaired fasting glucose when, after not eating for at least eight hours (fasting), their blood sugar level is between 110 and 125 mg/dL. This level is higher than normal but lower than the level used to diagnose diabetes. Approximately 13.4 million people in the United States, or about 7 percent of the population, have this condition.

Impaired Glucose Tolerance

A person has impaired glucose tolerance when another test, the "oral glucose tolerance test," also shows that they have blood sugar levels that are higher than normal but not high enough to diagnose diabetes. In this test, the person drinks a liquid that has 75 grams of glucose in it and their blood sugar level is then tested several times over the next two to three hours. Under these conditions, a blood sugar level of below 140 is normal. Impaired Glucose Tolerance (IGT) is diagnosed when the glucose level is 141 to 199 mg/dL.

What Does It Mean to Have An Impaired Glucose Metabolism?

If you have this condition you are at risk of developing diabetes and its complications in the future.

Scientists are now trying to learn how to predict which people with impaired glucose tolerance will go on to develop diabetes and how they can prevent that from happening. In the meantime, it is very important that you do what you can to lower your risk for diabetes by controlling your weight, exercising, and eating a good diet. These are good health goals for everyone, but they are especially important for you!

Who is at Risk:

The most common symptoms of diabetes are: being very thirsty, having to urinate more often than usual, being very hungry, losing weight, feeling very tired, and having problems with your eyes, itchy skin, or cuts or infections that take a long time to heal.

If you or your loved ones have any of these symptoms, please call your doctor. But even if you don't have any symptoms, that doesn't mean you don't have diabetes. Some people with diabetes don't have any symptoms at all. Others think their symptoms are just part of growing older. And for some people, the symptoms come on so slowly that they don't even notice them for quite some time. Many people never even know they have diabetes until a serious complication, such as nerve damage, comes up and they visit a doctor.

Some drugs can increase your blood sugar, too. Some of these are: glucocorticoids (a certain type of steroid), thiazide diuretics (a type of fluid/blood pressure drug), drugs that contain estrogen, and nicotinic acid. Ask your doctor or pharmacist if any of the drugs you take can cause this problem.

Anyone can develop diabetes. But some people, because of lifestyle or hereditary (family) factors (called risk factors), are more likely than others to develop the disease.

How Much do You Know about Your Diabetes:

To take good care of yourself and stay healthy, you need to have certain tests from time to time. These exams will help your doctor to treat your diabetes in the best way possible, and will help you to avoid complications.

The section below lists some of the most common tests you'll need and why they are important. It also suggests you find out whether or not you have had these tests already and lists some options for your next steps.

We understand that keeping tabs on so many aspects of your health can be bothersome (not to mention somewhat time consuming!). But if you get frustrated with all of this, just remember -- a few minutes spent at the doctor's office now can mean a lifetime of good health.

Feel free to take the information in the following table to your doctor for review at your next visit.

Did You Know that...	Why?	What I've Done to Date	My Next Step for Health
...you need a hemoglobin blood sugar test (also called an A1c test) every three months?	The hemoglobin blood sugar test shows how well you've controlled your blood sugar over the past three months.	I've asked my doctor about the hemoglobin blood sugar test. (yes)(no) My doctor says my hemoglobin blood sugar test result should be _____	1. Call my doctor for my most recent test results. 2. Talk to my doctor about my test results at my next visit. 3. Ask my doctor when I need another test, and make an appointment. (Don't forget to write down the date!)
...you need to have your cholesterol tested at least once a year?	High cholesterol levels mean you are at risk for heart disease, a serious condition.	I've had a cholesterol test in the last year. (yes)(no) I know what my cholesterol test results should be, to stay healthy. (yes)(no) My goal cholesterol levels are: Total chol _____ HDL _____ LDL _____ Triglycerides _____	1. Call my doctor for my most recent test results. 2. Talk to my doctor about my test results at my next visit. 3. Ask my doctor when I need another test, and make an appointment. (Don't forget to write down the date!)
...you need a yearly eye exam?	Poorly controlled diabetes can cause serious eye damage, leading to blurry vision or even blindness. An exam can detect early damage, when treatment is most effective.	I've talked with my doctor about the warning signs of eye problems. (yes)(no) I've had an eye exam (which used drops to dilate my eyes) in the last year. (yes)(no)	1. Call my doctor for my most recent test results. 2. Talk to my doctor about my test results at my next visit. 3. Ask my doctor when I need another test, and make an appointment. (Don't forget to write down the date!)
...you need a yearly urine test?	A urine test looks for signs of kidney damage. Poorly controlled diabetes can cause serious damage, even kidney failure.	I've talked with my doctor about the warning signs of kidney damage. (yes)(no) I've had a urine test in the last year. (yes)(no)	1. Call my doctor for my most recent test results. 2. Talk to my doctor about my test results at my next visit. 3. Ask my doctor when I need another test, and make an appointment. (Don't forget to write down the date!)
...you need a yearly foot exam?	Diabetes can affect your circulation and the nerves in your feet, possibly leading to amputation.	I've asked my doctor about the warning signs of foot problems and nerve damage. (yes)(no) I've had a foot exam by my doctor in the last year (yes)(no)	1. Call my doctor for my most recent test results. 2. Talk to my doctor about my test results at my next visit. Write down the date. 3. Ask my doctor when I need another test, and make an appointment. (Don't forget to write down the date!)

Preventative Care Guidelines:

Having a condition like diabetes sure can be a challenge sometimes. There are so many details to remember and appointments to schedule! To help you keep track of it all, we've put together some handy forms. (We'd rather you spend your time out taking a walk, rather than struggling with how to manage your diabetes!)

This section focuses on preventive care-the tests you need once a year or so to stay healthy and avoid complications. In the section

The form below lists the tests you need and how often you should have each done.

Please note: The information in this handout is not intended to take the place of your doctor or other health care professionals. It is a resource to help you make the best decisions and get the most from the medical services available to you. A licensed physician should be consulted for diagnosis and treatment of all medical conditions.

Print out this Web page and ask your doctor for help in filling in the blanks. Then you'll be well on your way to keeping good track of your condition.

Activity	How Often	Your Goals
Discuss your diabetes management plan with your doctor to make sure you are doing the right things to manage your health	At least two times per year	Have a good understanding of what you need to do to take care of your diabetes
Get your hemoglobin blood sugar test measured and checked by your doctor	Twice per year if you're consistently able to keep your blood sugar controlled; four times per year if your blood sugar's unstable	Your hemoglobin blood sugar test should always be less than 7%
Have a complete physical exam at your doctor's office	Once per year	The exam show that you are healthy and that your diabetes is in control
Have your weight measured at your doctor's office	Each time you visit your doctor	Keep your Body Mass Index (called BMI) less than 27 If you're overweight, work with your doctor to create a plan that helps you achieve gradual weight loss of one pound per week
Have your doctor give you a thorough foot exam	Once per year at a minimum More frequently if you are at risk for foot ulcers	To have no foot sores, wounds or ulcers
Examine and take care of your own feet	Every day	No foot sores, wounds, ulcers or loss of feeling in your feet
Get your cholesterol levels checked by your doctor	Once per year	Your LDL (low-density lipoproteins) should be no more than 100 mg/dl Your TG (triglycerides) should be less than 200 mg/dl Your HDL (high-density lipoproteins) - the so-called "good" cholesterol, should be at least 55 mg/dl for women and 45 mg/dl for men
Glucose Meter (blood sugar testing machine) maintenance	Once per year	To be sure that your blood sugar testing machine is accurate, and working correctly
Urine Test for protein (the microalbuminuria test)	Once per year	A test result of 30 shows that your kidneys are working well
Have your blood pressure measured	Every time you visit your doctor It's also good to measure your own blood pressure in between doctor visits	A blood pressure of less than 130/80 for people who don't have a history of high blood pressure For people with a history of a high blood pressure (the top number being 180 or more: the goal is to have it less than 160 For people with this history, if the blood pressure can be controlled to 160 or less, the next goal is 140
Dilated eye exam by an MD eye doctor (ophthalmologist)	Once per year	No eye damage from diabetes (called retinopathy)
Flu (Influenza) vaccine	Once per year	Avoid getting the flu
Pneumonia shot (called the pneumococcal vaccine)	At least one time	Avoid getting pneumonia
Dental Check Up	Two times per year	No gum disease

Measuring your blood sugar yourself	<p>This is different for each person. Ask your doctor how often you should check your blood sugar.</p> <p>General guideline:</p> <ul style="list-style-type: none"> • For Type 1 diabetes: 3-4 times per day • For Type 2 diabetes: once per day (or more often if necessary) 	<p>The goal depends on the type of measuring device used. Ask your doctor to provide guidance about this.</p> <p>General guidelines when measuring whole blood:</p> <ul style="list-style-type: none"> • Before meals: 80-120 mg/dl • 1 hour after meals: less than 165. If it's 180 or more, you may need to adjust your medicine. Ask your doctor about this. • 2 hours after meals: less than 110. <p>If it's 140 or more, you may need to adjust your medicine. Ask your doctor about this.</p> <ul style="list-style-type: none"> • Bedtime: 100-140 mg/dl <p>When measuring plasma:</p> <ul style="list-style-type: none"> • Before meals: 90-130 mg/dl • Bedtime: 110-150 mg/dl
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Treatment Options:

Your doctor may prescribe one or more medicines to help you control your diabetes and stay healthy. The medicines prescribed depend on several things, such as the type of diabetes you have, how severe your condition is, and your age. Some medicines are taken as a pill (oral medication), while others are injected into the body.

Click on the links below to read more about diabetes medicines, including their brand names (what the drug companies have named them), their generic (non-brand) names, whether or not you can get the drug in a generic form, how they work, how you take them, and helpful information about each drug.

Oral Diabetes Medicines

Brand Name	Generic Name	Generic Available?
Amaryl	Glimepiride	No
DiaBeta	Glyburide	Yes
Diabinese	Chlorpropamide	Yes
Dymelor	Acetohexamide	Yes
Glucotrol	Glipizide	Yes
Glucotrol XL	Glipizide	Yes
Glynase Pres Tab	Glyburide	Yes
Micronase	Glyburide	Yes
Orinase	Tolbutamide	Yes
Tolinase	Tolazamide	Yes

How does it work? These drugs stimulate your won body (your pancreas) to make more insulin.

How do I take this drug? Your doctor or pharmacist will tell you how often to take these medecines. Be sure to take them at the same time each day

What should I know about this drug? Possible side effects of these drugs include a low blood sugar reaction, an upset stomach, skin rash, bloating and weight gain. You should avoid alcohol when taking these drugs, as it might cause a low blood sugar reaction.

Drug Interactions: These medications can cause low blood sugar (called hypoglycemia) when taken with other medications.. Some of these medications include nonsteroidal anti-inflammatories (ie Motrin, ibuprofen, Advil, naproxen), Coumadin, and beta-blocking drugs (ie Inderal, propranolol, Lopressor). High blood sugar reactions (called hyperglycemia) can occur with diuretics or

water pills (ie hydrochlorothiazide), corticosteroids (ie prednisone), thyroid medicines, estrogen pills (ie Premarin), niacin, dilantin, and calcium channel blocking drugs (ie Verapamil). Always check with your doctor or pharmacist before taking these medications with others.

Pregnancy: These medications are not recommended during pregnancy. Use of these during the 2nd and 3rd term of pregnancy does not appear to affect the fetus, but use during pregnancy should be discussed with a physician. These medication should not be used by breast-feeding mothers unless otherwise told by your doctor.

Brand Name	Generic Name	Generic Available?
Glucophage	Metformin	Yes
Glucophage	Metformin	Yes
Riomet	Metformin	No

How does it work? This drug lowers your blood sugar levels by making sure your body does not make too much sugar. It helps to regulate your insulin levels.

How do I take this drug? Most people take this drug two to three times a day, with meals. Your doctor or pharmacist will tell you how often to take it. Riomet is available as a liquid for those having difficulty swallowing the pills.

What should I know about this drug? This drug can make you sick if you have more than two to four alcoholic drinks a week. If you drink that much, tell your doctor. You probably should not take this drug. Also, do not take this drug if you have any kidney problems. Possible side effects include weakness, fatigue, nausea, dizziness, and breathing problems. Tell you doctor right away if you have any of these symptoms. Other, less serious side effects include a metallic taste in the mouth, diarrhea, and stomach problems. These side effects usually go away after you've been taking the drug for a while or after your doctor adjusts your dosage.

Drug Interactions: If these medications are taken with certain other drugs, the effects of either could be increased, decreased, or changed. It is especially important to check with your doctor or pharmacist before starting a new medication. Some medications that may interact include amiloride (Moduretic), calcium channel blockers (heart medications) such as Calan, Isoptin, and Procordia, decongestants, airway-opening drugs such as Sudafed and Proventil, digoxin (Lanoxin), estrogens such as Premarin, furosemide (Lasix), niacin (Niaspan), some birth control pills and phenytoin (Dilantin).

Pregnancy: If you are pregnant or plan to become pregnant, tell your doctor immediately. The medications should not be taken during pregnancy. But it is very important to maintain normal blood sugar (glucose) levels during pregnancy, so your doctor may prescribe insulin injections instead. Always talk with your doctor or pharmacist before stopping your medication

It is not known whether these medications appear in human breast milk. Therefore, women should discuss with their doctors whether to discontinue the medication or to stop breastfeeding. If the medication is discontinued and if diet alone does not control glucose levels, then your doctor may consider insulin injections.

Potential Warning Signs: To avoid any serious complications with any of these medications, promptly report the following to your doctor: Extreme weakness or tiredness, low body temperature, rapid breathing or trouble breathing, sleepiness, slow or irregular heartbeat, unexpected or unusual stomach discomfort, and unusual muscle pain. These may be warning signs of serious side effects.

Brand Name	Generic Name	Generic Available?
Avandamet	Metformin and rosiglitazone	No
Glucovance	Metformin and glyburide	No
Metaglip	Metformin and glipizide	No

How does it work? Metaglip and Glucovance combine 2 different types of medications for diabetes into one pill. Metformin lowers your blood sugar levels by making sure your body does not make too much sugar. It helps to regulate your insulin levels. Glyburide stimulates your own body (your pancreas) to make more insulin.

Avandamet combines 2 different medications Metformin and Avandia. Metformin lowers your blood sugar levels by making sure your body does not make too much sugar. It helps to regulate your insulin levels. Avandia helps your body's cells to become more sensitive to insulin. The result is that the insulin in your body has an easier time carrying sugar out of your blood and into the cells.

How do I take this drug? Most people take this drug once or twice a day, with meals. Your doctor or pharmacist will tell you how often to take it.

What should I know about this drug? Because these product contain two different medications to treat diabetes, its potential side effects are a combination of the two individual drugs. These products can make you sick if you have more than two to four

alcoholic drinks a week. If you drink that much, tell your doctor. You probably should not take this product. In general, you should avoid alcohol when taking this product, as it might cause a low blood sugar reaction. Also, do not take these drugs if you have any kidney problems.

For the glipizide or glyburide products found in Metaglip and Glucovance, some possible side effects include a low blood sugar reaction, an upset stomach, weakness, fatigue, nausea, dizziness, skin rash, bloating and breathing problems. Tell your doctor right away if you have any of these symptoms. Other, less serious side effects include a metallic taste in the mouth, diarrhea, and stomach problems. These side effects usually go away after you've been taking the drug for a while or after your doctor adjusts your dosage.

For the Avandia product found in Avandamet this drug may very rarely cause serious liver problems. That kind of a side effect is not common, but it is important that your doctor makes sure your liver is working properly (by checking your liver enzymes) if you take one of these drugs. Call your doctor right away if you have any of these side effects, as they can be signs of liver disease: nausea, vomiting, stomach pain, lack of appetite, fatigue, a yellow tinge to your eyes or skin, or dark colored urine. If you take birth control pills, these drugs might make them less effective, possibly leading to pregnancy. Other possible side effects are weight gain, anemia (severe tiredness), and swelling in your legs or ankles.

Brand Name	Generic Name	Generic Available?
Precose	Acarbose	No
Glyset	Miglitol	No

How do these drugs work? These drugs make your body slow down in absorbing starches from your food. This makes your blood sugar rise less, and slower, than before, especially after meals.

How do I take this drug? Most people take these drugs three times a day, with the first bite of each meal. Your doctor or pharmacist will tell you how often to take it.

What should I know about this drug? You might have some stomach problems (gas, bloating, diarrhea) at first, but they usually goes away once your body gets used to the medicine. If you are taking either of these drugs with other diabetes medicines, it is a good idea to have some dextrose handy in order to treat symptoms of low blood sugar (such as trembling, sudden weakness, hunger, sweating, headache, double vision, confusion). Dextrose is available without a prescription at your local pharmacy. Just taking something with sugar in it won't always work, because these drugs can interfere with your body's absorption of table sugar.

Drug Interactions: If these medications are taken with certain other drugs, the effects of either could be increased, decreased, or changed. It is especially important to check with your doctor or pharmacist before combining these medications with the following:

airway-opening drugs such as Proventil , calcium channel blockers (heart and blood pressure medications such as Cardizem and Procardia), digoxin (Lanoxin), estrogens such as Premarin, major tranquilizers such as Compazine and Mellaril, birth control pills phenytoin (Dilantin), thyroid medications such as Synthroid and Thyrolar and water pills (diuretics) such as HydroDIURIL or Moduretic.

Pregnancy: The effects of these medications during pregnancy have not been adequately studied. If you are pregnant or plan to become pregnant, tell your doctor immediately. He may switch you to insulin during your pregnancy, since normal blood sugar levels are very important for the developing baby.

It is not known whether these medications appears in breast milk. For safety's sake, consult with your doctor or pharmacist on whether to take these medications while breastfeeding.

Brand Name	Generic Name	Generic Available?
Actos	Pioglitazone	No
Avandia	Rosiglitazone	No

How do these drugs work? These drugs help your body's cells to become more sensitive to insulin. The result is that the insulin in your body has an easier time carrying sugar out of your blood and into the cells.

How do I take these drugs? Actos is usually taken once a day, while Avandia is taken once or twice a day. Both can be taken with or without meals. Your doctor or pharmacist will tell you how often to take it.

What should I know about these drugs? Possible side effects include headache, low blood sugar (hypoglycemia), muscle aches, sore sinuses, sore throat, nausea, vomiting, stomach pain, weight gain, anemia (severe tiredness), and swelling in your legs or ankles.

Drug Interactions: If these medications are taken with certain other drugs, the effects of either could be increased, decreased, or

changed. It is especially important to check with your doctor or pharmacist before combining these medications with the following:
ketoconazole (Nizoral). If you take birth control pills, these drugs might make them less effective, possibly leading to pregnancy.

Pregnancy: The effects of these medications during pregnancy have not been adequately studied. If you are pregnant or plan to become pregnant, tell your doctor immediately. He may switch you to insulin during your pregnancy, since normal blood sugar levels are very important for the developing baby.

It is not known whether these medications appears in breast milk. For safety's sake, consult with your doctor or pharmacist on whether to take these medications while breastfeeding.

Potential Warning Signs: A drug that was similar to these drugs, called Rezulin, was taken off the market a while ago because some people who were taking it had serious liver problems. That kind of a side effect is not as common with these medications, but it is important that your doctor makes sure your liver is working properly (by checking your liver enzymes) if you take one of these drugs. Call your doctor right away if you have any of these side effects, as they can be signs of liver disease: nausea, vomiting, stomach pain, lack of appetite, fatigue, a yellow tinge to your eyes or skin, or dark colored urine.

In rare instances, these medications can cause swelling and fluid retention that can lead to congestive heart failure. If you already have this problem, you should avoid these medications. If you develop symptoms that signal the problem--such as shortness of breath, fatigue, or weight gain--you should check with your doctor immediately; the drug will probably have to be discontinued.

Brand Name	Generic Name	Generic Available?
Prandin	Repaglinade	No
Starlix	Nateglanide	No

How do these drugs work? These drugs help your pancreas make more insulin right after meals, which lowers your blood sugar level.

How do I take these drugs? Most people take these drugs in the half-hour or so before a meal. Your doctor or pharmacist will tell you how often to take it.

What should I know about these drugs? Side effects cannot be anticipated. If any develop or change in intensity, inform your doctor as soon as possible. Only your doctor can determine if it is safe for you to continue taking these medications. The common side effects include: back pain, constipation, diarrhea, headache, heart burn, joint pain, low blood sugar, nasal soreness, nausea and vomiting. Some less common and rare side effects may include: allergic reactions, angina (chest pain), and tooth problems.

Drug Interactions: If these medications are taken with certain other drugs, the effects of either could be increased, decreased, or changed. It is especially important to check with your doctor or pharmacist before combining these medications with the following: airway-opening drugs such as Proventil , beta blockers such as the blood pressure medications Inderal and Tenormin calcium channel blockers (heart and blood pressure medications such as Cardizem and Procardia), carbamazepine (Tegretol),erythromycin (Eryc, Ery-Tab, PCE), estrogens such as Premarin, major tranquilizers such as Compazine and Mellaril, birth control pills, nonsteroidal anti-inflammatory drugs such as Advil, Motrin, thyroid medications such as Synthroid and Thyrolar and water pills (diuretics) such as HydroDIURIL, Enduron, Moduretic

Pregnancy: The effects of these medications during pregnancy have not been adequately studied. If you are pregnant or plan to become pregnant, tell your doctor immediately. He may switch you to insulin during your pregnancy, since normal blood sugar levels are very important for the developing baby.

It is not known whether these medications appears in breast milk. For safety's sake, consult with your doctor or pharmacist on whether to take these medications while breastfeeding.

Injectable Diabetes Medicines

Insulin Type	Brand Names	Start of Action	Peak Action	How Long	Source
Rapid-Acting					
Lispro	Humalog	5 Minutes	1 hour	2 to 4 hours	Human
Insulin aspart	NovoLog	5 Minutes	40-50 Minutes	3-5 hours	Human
Short-Acting					

Regular	Humulin R, Insulin R, Iletin I Regular, Iletin II Regular, Novolin R, Velosulin Human	1/2 to 1 hour	2 to 4 hours	4 to 6 hours	Human, pork, beef
Intermediate-Acting					
NPH (isophane insulin suspension)	Humulin N, Insulin NPH, Iletin I NPH, Iletin II NPH, Novolin N	1 to 4 hours	4 to 12 hours	14 to 24 hours	Human, pork, beef
Lente (insulin zinc suspension)	Humulin L, Iletin I Lente, Iletin II Lente, Novolin L	1 to 4 hours	6 to 14 hours	14 to 26 hours	Human, pork
Long-Acting					
Ultralente (insulin zinc suspension, extended)	Humulin U, Ultralente	3 to 6 hours	8 to 30 hours	18 to 36 hours	Human
Slow Released					
Insulin Glargine	Lantus	1.1 hour	none	24 hours	Human
Other Types					
70/30	Humulin 70/30, Novolin 70/30	1/2 hour	2 to 12 hours	14 to 24 hours	Human, pork
50/50	Humulin 50/50, Novolin 50/50	1/2 hour	2 to 5 hours	14 to 24 hours	Human
U-500	Humulin R (concentrated), Iletin II regular (conc)	1 to 3 hours	6 to 12 hours	12 to 18 hours	Pork
75% insulin lispro protamine/ 25% insulin lispro	Humalog mix 75/25	15 minutes	1 hour	14 to 24 hours	Human

NOTE: The time course of action of any insulin may vary in different individuals, or at different times in the same individual. Because of this variation, time periods indicated here should be considered as general guidelines only.

The Role of Insulin Therapy in Diabetes Care:

Insulin Overview

The goal of diabetes care is to keep blood glucose (sugar) as close to normal as possible. Doing this requires a variety of medical and self-care interventions including the use of medicine and blood glucose monitoring. People with Type 2 diabetes are usually prescribed oral medicine to help control blood glucose. When oral medicines are no longer able to control blood glucose, a doctor will usually prescribe insulin to use in combination with your oral medicine or by itself.

Insulin is a hormone that is made by your body in an organ called the pancreas. Insulin helps keep your blood glucose in a normal range by moving glucose out of your blood and into your cells, where it is used for energy. If you have Type 1 diabetes, your body is not able to make enough insulin and if you have Type 2 diabetes, your body is resistant to the effects of insulin or it is not able to use the insulin that is there. Most Type 2 diabetics begin taking oral medicine to control blood glucose. In some cases, the pills stop working and insulin is used to control blood glucose and remain healthy.

Insulin can also be used temporarily to gain initial blood glucose control, overcome dangerous amounts of glucose in the blood and help control blood glucose levels when they rise due to illness.

Different Types of Insulin

There are several types of insulin, each of them working at different speeds and lengths of time. Your doctor may have you use one or more types of insulin in order to get the right amount of insulin in your body at the right times of the day. The different types of insulin are:

- *Rapid Acting* - begins working within 10-20 minutes from the time it is injected. It can last for 2-5 hours.
- *Short Acting* - begins working 30-60 minutes from the time it is injected. It can last for 5-8 hours.
- *Intermediate Acting* - begins working 1-4 hours from the time it is injected. It can last for 14-24 hours.
- *Long Acting* - begins working 3-6 hours from the time it is injected. It can last 18-36 hours.
- *Other Insulin Products* - insulin that is pre-mixed.

The number of injections you need each day as well as the amount and type of insulin you use depends on how much you eat, when you eat, how much you exercise, your blood glucose goals and how your body uses insulin.

Preparing Insulin Therapy

Mixing Insulin

In some cases, doctors may prescribe more than one type of insulin. Often times, different insulin products will need to be mixed. Here are some helpful tips:

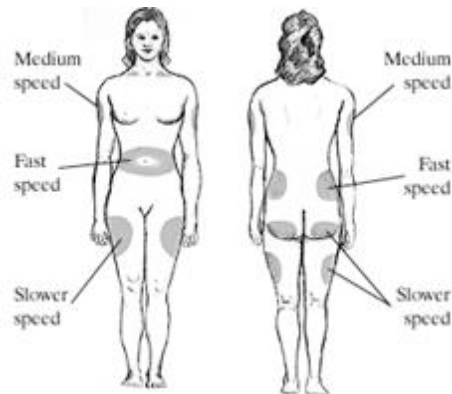
- Always draw the clear insulin into the syringe first.

- Tap the syringe to remove any air bubbles after both insulin have been loaded
- Inject insulin mixtures within 5 minutes of filling the syringe
- Never mix insulin glargine (Lantus®) with any other type of insulin

Some insulin comes already premixed. If you are a patient that needs to mix insulin, you may want to ask your doctor if premixed insulin will work for you.

Injection Sites

Insulin injections work better when given in certain areas of the body. Below is a diagram showing where some of the preferred sites are throughout your body. Each type of insulin is recommended for injection into a specific area of the body. This is because each area of the body has a different rate of absorption which must coincide with speed or time in which the insulin is intended to take affect (see "Different Types of Insulin").



Ask your doctor for the best places to inject the type(s) of insulin you are using.

Injection Methods

Besides the location of the injection, there are also some important things to keep in mind when you begin using insulin, they are:

- Use insulin that is kept at room temperature, it is less painful.
- Inject in the same body region each time you inject; it produces the best results for controlling blood glucose.
- Rotate your injection sites within the same region each time you inject. You should not inject in the same spot for a least a month, if possible.
- Use a new needle for each injection.

To make sure your insulin is ready for use, roll the vial gently between your hands. Do not shake the vial too hard or you will change the makeup of the insulin and decrease its potency. Below is some more information about preparing, mixing and injecting insulin.

Preparing the Insulin Bottle and Syringe

1. Wash your hands.
2. Roll the insulin bottle gently between your hands to mix it.
3. Use an alcohol swab to clean the top of bottle.
4. Draw the plunger back equal to the number of units of insulin you'll be using.
5. Insert the needle into the bottle and inject the air in the syringe into the bottle.
6. Pull back on the plunger, drawing the desired number of insulin units into the syringe.
7. Push the plunger to release any additional insulin in the syringe that is not needed.
8. Tap the top of the syringe to release any air bubbles that entered the syringe.

Injecting Insulin

1. Choose an injection site (should be recommended by your doctor).
2. Use an alcohol swab to wipe the area clean.
3. Pinch or pull the skin together at the injection site.
4. Insert the needle directly into the skin.
5. Press the plunger.

6. Pull the syringe out of the injection site, while placing an alcohol swab on the point of injection; wipe the area clean with the swab.
7. Dispose of the used needle and syringe in a Sharps container.

Allergic Reactions

Allergic reactions to insulin in some cases can be attributed to the type of insulin being used. For example, many insulin products are derived from beef and/or pork. Because the insulin isn't exactly the same as human insulin an allergic reaction is possible. Reactions manifest themselves in one of two ways:

- **Local Reaction** - the skin around the injection site gets red and itchy.
- **Systemic Reaction** - the entire body reacts to the insulin which can result in hives and red patches all over the body as well as changes to heart rate and breathing .

Certain drugs for example, antibiotics, can cause allergic reactions when taken with insulin as well. If you experience any allergic reactions when using insulin it is important to notify your doctor right away. Your doctor may be able to limit or eliminate your reactions.

Syringes and Needles

There are a variety of syringes and needles that can be used for injecting insulin. Most syringes have fill capacities ranging from 0.3ml to 2ml. Needles vary in thickness and length. Using these items requires you to follow some basic but important guidelines that include:

- Never share needles; you put yourself or somebody else at great risk of getting a blood-borne viral infection, such as HIV or Hepatitis.
- Throw away used needles and syringes in a biomedical, puncture-resistant container, such as a Sharps container. You can obtain a Sharps container from your local pharmacy or the internet. If you do not have a Sharps container, you can use a hard-walled laundry detergent container with a screw top or coffee can to dispose of your syringes and needles.
- Avoid recapping, bending or breaking needles; this helps decrease your chances of getting a needle stick injury.
- Avoid using syringes and needles more than once; you cannot guarantee the needle is sterile or has not been bent.

If you need to use the same needle more than once (not recommended), be sure to recap it after each use. Do not clean the needle with alcohol; it will remove the silicon coating on the needle making the injection more painful.

Blood Glucose Monitoring

Knowing when and how much insulin to use depends upon your blood glucose level. Diabetics that require insulin need to know what their blood glucose level is at different times of the day. A blood glucose-monitoring device allows you to do this.

Self-monitoring blood glucose devices can be bought at a pharmacy and some grocery or discount stores with pharmacies. Ask your physician which meter is best for you. Your pharmacists may also be able to help you. The supplies you will need to test your blood glucose include:

- Blood glucose meter
- Testing strips
- Lancets or small needles for pricking your finger; you should have a lancet device to make pricking easier
- Cotton balls to stop the bleeding

Here are some helpful tips for when choosing a blood glucose monitor.

- Make sure your meter is accurate for the climate in which you live; hot, cold, dry and humid conditions can make your monitor produce less than accurate results
- Be sure the monitor has a big enough memory to store around 100 test results
- If available, select a monitor that can download the test results into a computer or PDA
- Try and find a monitor that is compact; the smaller the monitor the more likely you are to carry it around with you and use it
- The meter should provide quick results
- Choose a meter that is easy to clean and maintain
- Make sure the monitor offers some method to test the accuracy of the results, i.e. test strips or solution.

Important Note:

Important Note: Make sure the test strips you buy can be used with the monitoring device that you have. Not all strips work in all devices.

Preparing for Blood Glucose Monitoring

Before testing your blood sugar make sure you read the instructions carefully. It is a good idea to bring your monitoring device to

your doctor appointment and/or when you meet with a diabetes educator so they can show you the proper way to use it. Your local pharmacist can also help you.

When you are ready to get started with home glucose monitoring, make sure to follow these steps:

- Wash your hands with soap and warm water and dry completely or clean the area with alcohol and dry completely.
- Use a clean lancet for each finger stick.
- Let your hands hang below your waist so the blood can pool in your fingers; this makes it easier to get a good size drop of blood.
- Remove a test strip from the container; cover the container to protect the other test strips from light and moisture.
- Prepare your lancet for pricking.
- Set up your blood glucose monitor for testing; make sure to read the instructions carefully.

Once you have gone through these steps you are ready to test your blood by following the steps below:

1. Prick the fingertip with a lancet.
2. Hold the hand down and hold the finger until a small drop of blood appears; catch the blood with the test strip.
3. Follow the instructions for inserting the test strip and using the blood glucose meter.
4. Record the test result.

Test Results

Your tests results are your guide to knowing if your blood glucose is under control or not. Here are some general guidelines that will help you to know if your blood glucose is under control:

- Before meals, your blood glucose level should fall within the range of 90-130 mg/dl.
- One hour after meals, your blood glucose level should be less than 165 mg/dl. If it's 180 mg/dl or more, you may need to adjust your medicine. Ask your doctor about this.
- Two hours after meals, your blood glucose level should be less than 140 mg/dl.

In general, home blood glucose monitoring devices produce accurate results. If your blood glucose levels do not meet the above goals, talk to your doctor.

Lastly, it is important to keep an accurate record of your test results. Most blood glucose monitors do this for you. Some even allow you to download your readings right into a computer or handheld device (PDA). With others, you'll need to write down the results yourself. Keeping a diabetes record or diary to track your blood glucose and other things, such your daily exercise and food intake, and sharing this information with your doctor will help you manage your diabetes.

Additional Information:

There is a wealth of information about diabetes on the Internet. Be careful, though. Stick to the Websites that are sponsored by well-known organizations and agencies, such as the American Diabetes Association. Listed below are some worthwhile sources of information. Maxor is not responsible for the content of these websites that it does not maintain.

American Diabetes Association

www.diabetes.org

1-800-342-2383

1-800-232-3472

American Dietetic Association

www.eatright.org

1-800-877-1600

1-800-366-1655

Diet and nutrition Consumer hotline and dietician referral

American Heart Association

www.americanheart.org

1-800-242-8721

1-800-242-1793

Blood pressure, cholesterol, fitness, and heart

Centers for Disease Control and Prevention

www.cdc.gov

www.cdc.gov/diabetes

1-800-232-2522

1-800-232-3422

Vaccines and general health diabetes

Juvenile Diabetes Foundation International

www.jdfcure.org

1-800-223-1138

Diabetes in children

National Diabetes Education Program

www.ndep.nih.gov

National Eye Institute

www.nei.nih.gov

1-301-496-5248

Eye care

National Heart, Lung, and Blood Institute

www.nhlbi.nih.gov

1-800-575-9355

Blood pressure, cholesterol, heart, and smoking cessation

National Institute of Diabetes and Digestive and Kidney Diseases

www.niddk.nih.gov

1-800-438-5383

Diabetes, stomach, and kidneys