



# *X-Plain™*

## *Diabetes - Introduction*

### **Reference Summary**

Diabetes is a disease that affects millions of Americans every year. Your doctor may have informed you that you have diabetes. Although there is no known cure for diabetes, several known treatments can control this disease.

The success of any diabetes treatment depends largely on the patient. This reference summary will review the different types of diabetes, their control and treatment.

### **What Is Diabetes?**

The body is made of millions of cells that need energy to function. The food you eat is turned into sugar, called glucose. Sugar is carried to the cells through the blood stream. It is one of many substances needed by cells to make energy.

For glucose to enter the cells, 2 conditions must be present. First, the cells must have enough “doors,” called receptors. Second, a substance called insulin is needed to “unlock the receptors.” Once these two conditions are met, glucose enters the cell and is used by the cell to make energy.

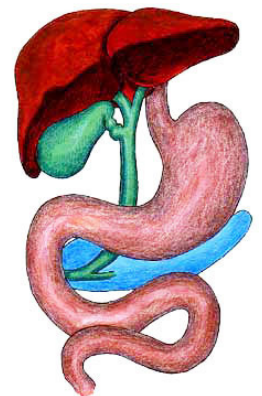
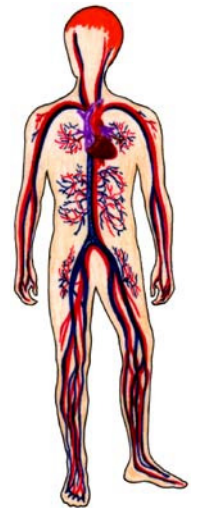
Without energy, all cells die.

Insulin is a chemical hormone, which is manufactured in the pancreas. Insulin levels in the blood vary with the amount of glucose present in the blood.

Diabetes is a disease that makes it difficult for the cells of the body to get the glucose they need to make energy.

Diabetes can make it difficult for the cells of the body to receive adequate amounts of glucose in two ways. First, the pancreas may not make insulin. Since insulin is needed to “unlock the receptors,” glucose cannot enter the cells. Therefore, glucose levels increase in the blood. This is known as Type 1 diabetes.

Type 2 diabetes occurs when insulin is present in enough quantities, but there is a decrease in the number of receptors on the cells to allow glucose to enter. Even though insulin is present, it cannot be



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used effectively, a situation called “Insulin Resistance” which results in high levels of glucose in the blood.

Type 2 diabetes is more common than Type 1.

The exact causes of diabetes are unknown. However, it tends to run in families. Diabetes is not a contagious disease.

## Signs And Symptoms Of Diabetes

Diabetes is detected when your doctor or nurse finds a high level of sugar in your blood or urine. The most reliable test results are obtained when the sugar level in the blood is checked before any food or liquid is ingested. This is known as a fasting blood sugar. A range for a normal fasting blood sugar is between 70mg/dL and 120mg/dL.

Common signs and symptoms of diabetes include:

- Excessive thirst
- Frequent urination
- Excessive Hunger
- Weight loss
- Fatigue
- Changes in vision
- Slow-healing cuts or infections
- Persistent itching of the skin.

If left untreated, the level of glucose in the blood can become very high, inducing coma and possibly death. The signs and symptoms you have depend on when your diabetes is discovered and what type of diabetes you have.

## Treatment Options

Diabetes cannot be cured. Keeping the level of sugar in the blood within its normal range can, however, control it. The treatment and management of diabetes varies from patient to patient. Your doctor and diabetic care team will



decide what form of treatment is best for you.

Patients with Type 1 diabetes do not produce insulin. Patients who lack insulin in their bodies must make certain adjustments in their diet and must take insulin. Insulin can only be given through injections. These injections may need to be given several times a day. Patients with Type 2 diabetes may not need insulin. Diabetes in these patients is typically controlled with diet and exercise. Sometimes oral medications are also prescribed. In some cases of Type 2 diabetes, insulin may also be required.

The success of your treatment depends largely on you. When you learn AND practice how to control your sugar level, you will enjoy a healthier life.

## **Controlling Diabetes**

You can control diabetes by:

- Eating right
- Exercising
- Monitoring your blood sugar level
- Taking prescribed medications
- Learning about diabetes

Your dietitian or diabetes educator will explain to you how you can plan your meals and answer any questions you may have. The three goals of eating right are:

- Controlling your weight
- Keeping the level of blood-sugar at a normal level
- Reducing fat in the body.

A healthy diet may include changing what you eat, how much you eat, and how often you eat. However, you may be surprised by how many healthy and tasty food options you have.

Exercise helps diabetic patients in many ways. It lowers glucose levels, helps weight-loss, and maintains a healthy heart and healthy circulation. In addition, exercising helps relieve stress and strengthen muscles.

Your healthcare team will discuss your exercise plan with you. Always check with your doctor before starting a new exercise program.

Blood sugar testing is important in order to find out if your blood sugar level is where it should be. If your blood sugar is too low or too high, you may need a change in your diabetes medication, diet, or exercise plan. If a change is needed, your doctor or diabetic care team will give you instructions on what you should do.

Your blood sugar level is determined by testing a small drop of blood obtained from one of your fingers. This drop of blood is obtained by sticking your finger with a lancet. Blood sugar is usually checked 1 to 4 times each day. This can be done at home. Most diabetics become very competent at checking their own blood sugar.

Your diabetes educator will teach you how to test your blood sugar correctly and will help you determine the times of day to do the tests. He or she will also teach you how to make changes in diabetes medication, diet, or exercise to help control your blood sugar.

The educator will also review your blood sugar records and make any necessary changes in your therapy.

In cases of very high blood sugar levels that do not respond to diet and exercise plans, medications may be needed. Your doctor will tell you if you need medications or insulin.

If insulin is needed, it can only be injected. Insulin is needed for all patients with Type 1 diabetes and for some patients with Type 2 diabetes.

Blood sugar levels are very important to determine whether diabetes is controlled at the specific time the blood test is done.

There is, however, another blood test known as Hemoglobin A1C, this blood test determines how well the sugar has been controlled over the previous 3 to 4 months. A normal level should be less than 8%.

## **Hyperglycemia And Hypoglycemia**

When controlling diabetes, your blood sugar can become too high or too low. These conditions should be taken seriously. Fortunately, you can easily regain control of your blood sugar.

When too much sugar is in your blood, this condition is called hyperglycemia. Hyper is Latin and means “more.” Glycemia is also Latin and means “sugar in the blood.”

Hyperglycemia is caused by eating too much food, eating sugary foods, or by not taking your medication. It can also occur when you are sick. If not treated, hyperglycemia can cause you to go into a coma.

Signs of high blood sugar, or hyperglycemia, include:

- Dry mouth
- Thirst
- Frequent urination
- Blurry vision
- Fatigue or drowsiness
- Weight loss.

When you have high blood sugar, drink water or other sugar-free liquids. Check your blood sugar and stick to your diet plan. If your blood sugar remains high, call your doctor. Your doctor will tell you what is considered high for you. If your blood sugar is too high, you may need to go to the hospital.

Hypoglycemia occurs when too little sugar is present in your blood. Hypo is Latin and means “less.”

Hypoglycemia usually occurs with patients who take insulin or other medications. Taking too much insulin can cause it. That is why it is also known as insulin shock.

Hypoglycemia can also be caused when you decrease your food intake or skip a meal, or when you exercise more than usual. Signs of low blood sugar, or hypoglycemia, include:

- Sweating, shaking, nervousness, pounding heart
- Hunger
- Dizziness, faintness
- Personality change, confused thinking, impatience, crankiness
- Numbness of lips and tongue
- Headache
- Blurred vision, and slurred or slowed speech.

If not treated, low blood sugar can lead to fainting or seizures. Diabetics experience different signs when their blood sugar is low. You should become aware of how you feel when your blood sugar is too low.

Some patients do not experience any signs when their blood sugar is low. These patients must depend on blood sugar testing to find out if they have hypoglycemia.

If you have low blood sugar, immediately eat or drink something containing fast-acting sugar. Examples include any of the following: half a cup of fruit juice, regular soda pop, ten gumdrops, or 2 teaspoons of sugar or honey.

If your symptoms do not disappear in 15 minutes or your blood sugar remains less than 80 mg/dL, take another dose of fast-acting sugar. Repeat every 10 to 15 minutes until the blood sugar is greater than 80.

If it is less than 30 minutes until your next meal, eat that meal. If it is more than 30 minutes, eat a snack such as half a sandwich or 3 Graham Crackers. Eat the meal or snack after you have taken a dose of fast-acting sugar. Do not subtract the snack from your next meal plan.

Do not subtract the snack from your next meal plan. Do not drive or operate equipment if you feel your blood sugar is low.

You should inform your family members and friends that you are diabetic, and that if they ever find you unconscious or not making sense, they should take you to a hospital immediately or call "911."

## **Complications Of Diabetes**

When you control the level of sugar in your blood, the signs of diabetes become less frequent. You will feel better and have more energy.

If you do not follow your diet, exercise, and perform sugar level tests, serious complications can arise. Complications of diabetes include damage to the nerves and blood vessels of the body.

It is not known why diabetes causes nerves to become damaged. The nerve damage is known as diabetic neuropathy. It usually involves the nerves going to the lower legs and feet. The feet or legs could feel numb or unusually cold.

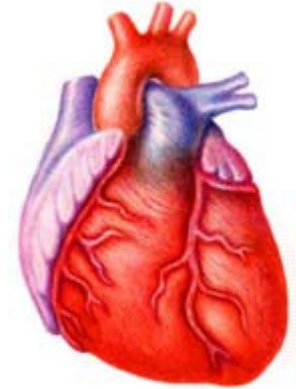
People with diabetes who have poor sensation in their feet must be very careful to avoid damaging their feet with ill-fitting shoes, hot water, or other forms of injury. Check your feet every day for cuts, sores, redness, or swelling. Use a mirror if needed. When visiting a medical clinic ask your doctor to check your feet.

Sexual dysfunction can occur. In men with diabetes, the most common problem is impotence due to damaged nerves going to the sexual organs. Urologists can help treat impotence with surgical and non-surgical treatments.

In women with diabetes, damage to nerves in the pelvic organs and genitals can lead to impaired sexual arousal and painful intercourse. If this occurs, your doctor can recommend a treatment.

Because the nerves that go to the heart may be affected, diabetics who have a heart attack may not experience the typically described chest pain.

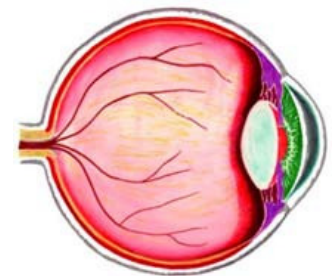
Diabetics should therefore be very suspicious when they feel chest heaviness, arm numbness, or indigestion. These could be symptoms of a heart attack.



High blood sugar can cause damage to large and small blood vessels. Fat in the blood is deposited on the walls of blood vessels. This causes hardening of the arteries or arteriosclerosis. Hardening of the arteries can occur in important arteries leaving or entering the heart. It can also occur in the legs.

Your diet plan is designed to lower the level of fat and cholesterol in the blood. When plaque and fat narrow small blood vessels, the blood flow to the organs becomes insufficient, causing the death of cells that are dependent on receiving the blood. It can also cause bleeding from narrowed blood vessels.

The thickening of small blood vessels is most noticeable in the kidney and in the back of the eye. When the small vessels in the back of the eye thicken, blood may leak into the inside of the eye or vitreous fluid. This causes the vitreous fluid to become cloudy. If not treated, this condition, called diabetic retinopathy, can lead to blindness. An eye doctor, or ophthalmologist, can help recommend treatment for this condition.



Diabetes may stop the kidneys from cleaning waste out of the blood. In addition, proteins that should stay in the body may leak into the urine. Your doctor can test for small proteins in your urine to determine if there are early signs of kidney diseases. People with diabetic kidney disease often develop high blood pressure.

It is very important that the high blood pressure be treated with blood pressure lowering medicines because this helps to prevent worsening of the kidney problems. If you have diabetic kidney disease, your doctor may also prescribe a special diet that is low in protein and restricted in salt. In rare cases, dialysis and even kidney transplants may become necessary.

Most doctors feel that controlling your diabetes will help prevent damage to blood vessels and nerves. Proper control of diabetes is a combination of a diet plan, medication, exercise, blood sugar monitoring, and good hygiene.

## **Summary**

Thanks to advances in medicine, diabetes can be successfully controlled. The role of the patient is essential in making a diabetes management plan succeed.

Diabetes management consists of:

- Following a diet plan
- Testing blood sugar
- Exercising
- Taking any prescribed medication on time
- Ensuring good hygiene
- Learning about diabetes.

Your doctor, nurse, and dietitian will explain to you your specific diabetes control plan. When you follow these instructions, the possibility of experiencing the problems of diabetes discussed in this program can be significantly reduced.

This reference summary is made available to you by your healthcare team to help you enjoy a healthier lifestyle while controlling diabetes.