

protein. The increase allowed 11% more glucose to clear out of the bloodstream with the same amount of insulin. "That change may possibly prevent the onset of diabetes," according to Dr. Bill Evans, director of Noll Laboratory for Human Performance Research at Pennsylvania State University. Dr. Evans also suspects that exercise may somehow stimulate our DNA, which orders the manufacturing of these proteins.

### How does strengthening exercise help?

Strengthening exercise has a "direct, beneficial effect" on controlling the level of blood sugar in diabetics, according to a 2001 study conducted by the USDA Nutrition Center on Aging at Tufts University. Dr Jennifer Layne author of the study explains: "Skeletal muscle accounts for 70% to 80% of the removal of sugar from the bloodstream." Adding muscle increases the body's uptake of blood sugar (glucose) and strengthening exercises have been shown to help type 2 diabetics to reduce their diabetes medication. A 1998 study followed individuals with impaired glucose tolerance. The study found that several months of strengthening exercises led to a much greater increase in insulin sensitivity in the participants as compared with those who engaged in just cardiovascular exercise. Strengthening exercise helps to control body fat. Excess body fat releases immune chemicals called cytokines that block insulin's signals. In response, your body churns out two to three times more insulin.

### Is it true that exercise is more effective than drugs for preventing diabetes?

Scientists involved with the Diabetes Prevention Program Research Group followed 3,200 people from 27 different clinics across the country. The 3,200 people were not yet diabetics, however, they were all high risk for diabetes since they all had blood sugar levels above normal. The participants were divided into three groups: the first group took medication, the second group took placebos and the third group focused only on lifestyle. The lifestyle group was coached on weight loss and exercised 2 1/2 hours a week. Three years later, the occurrence of diabetes was compared among the three groups. When compared to the placebo group, the researchers found the occurrence of diabetes

to be *58% lower in the exercise group* and only 31% lower in the medication group. *The exercisers were nearly twice as successful as the drug takers!*

### Why is my doctor concerned about heart disease?

Heart disease is the number one cause of death among diabetics! According to *Prevention Magazine*, diabetes can quadruple the risk of heart disease. A report in the October issue of the *Journal of the American Medical Association* states that exercise may help cut the substantial risk of cardiovascular problems plaguing people with type 2 diabetes and high blood pressure. According to Dr. Kerry J. Stewart, author of the report, "there is enough evidence from exercise studies and animal research to suggest exercise can have such benefits." Dr. Stewart goes on to say, "Patients with these conditions can be treated with gym therapy, which is low risk and widely available!"

### How can I get started on a diabetes exercise program?

Speak to one of our staff. They will start you on our diabetes exercise program and adjust it to specifically meet your needs. The program is based on the latest research and the recommendations of the American Diabetes Association. It will generally incorporate cardiovascular and strengthening exercise to help you prevent or control type 2 diabetes or to help manage type 1 diabetes.

For more information check the American Diabetes Association website at [www.diabetes.org](http://www.diabetes.org).

### Why is All Sport different?

It is often a surprise when members visit health clubs in other areas of the country and discover that all centers are not like All Sport. The most important difference is that All Sport is one of only a few gyms in the country that provides knowledgeable interactive training in the fitness center as part of membership. When most other gyms have trainers they are usually personal trainers trying to sell you personal training services at \$50 – \$75 an hour. Very few gyms invest in MedX equipment.

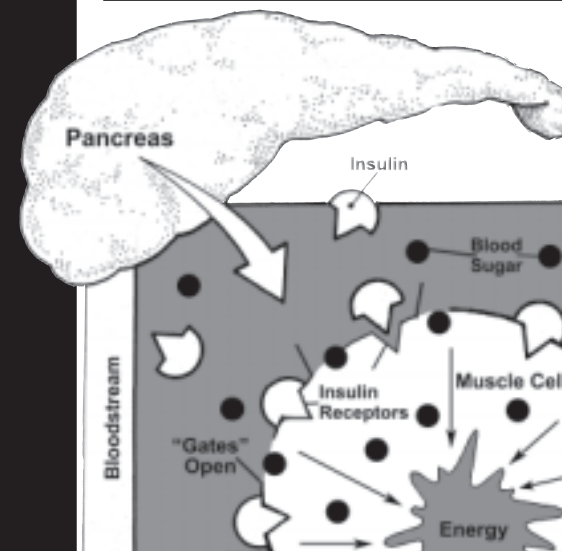
All Sport is also known as a health resource for its members, with the goal of helping you preserve your health with lifelong exercise.

Mike Arteaga

Owner, founder (1973), health and fitness consultant

7/1/05

# Diabetes: Prevention & Control



### How Insulin Works

The pancreas secretes insulin into the bloodstream as blood sugar increases. The insulin molecules then bind to special insulin receptors on the surface of cells in muscle and other organs. The receptors signal the cell to allow sugar to enter, so that it can be available as a source of energy.

In patients who are resistant to insulin, sugar has difficulty entering the cell even though insulin binds to the receptors. The buildup of sugar in the bloodstream results in the clinical syndrome of diabetes mellitus.

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# Diabetes Prevention and Control

The United States is experiencing a diabetes epidemic. 18 million Americans suffer from diabetes. 1.3 million new cases were diagnosed in 2003, which is a dramatic increase from the 878,000 new cases diagnosed in 1997. The National Center for Disease Control and Prevention announced that 40% of people over the age of 40 have pre-diabetes or blood sugar levels below the cut-off for diabetes, but are still dangerously high!

Diabetes is a major health concern because it greatly increases the risk of suffering from a long list of serious health problems including stroke, kidney failure, depression, and loss of eyesight, as well as infections that can lead to amputations. In addition, diabetes can quadruple the risk for heart disease, the number one cause of death among diabetics.

## What is diabetes?

Food is our body's source of fuel needed to produce energy. Our stomach breaks down the food we eat into glucose, a common sugar. Glucose is a major source of fuel for our body and is absorbed into the bloodstream for distribution throughout the body.

Whenever we eat, the amount of glucose in the blood (blood sugar) starts to rise. Insulin is a hormone produced in the pancreas that helps move blood sugar into the cells. As blood sugar rises, the pancreas pumps more insulin into the blood to stabilize blood sugar levels by pushing more sugar out of the blood and into the cells. With type 1 and type 2 diabetes the body has difficulty moving the glucose into the cells.

## What is Type 1 and Type 2 diabetes?

In type 1 diabetes, the pancreas doesn't make the insulin needed to move glucose from the blood into the cells, and daily insulin injections are needed in order to live.

In type 2 diabetes, the pancreas continues to make insulin, however, the amount of insulin produced is insufficient or the body doesn't respond as it should to the insulin (a situation called insulin resistance). Type 2 diabetes, represents about 90% of all cases of diabetes.

Insulin acts like a key that must open the insulin receptor lock on each cell to let the glucose in. With type 2 diabetes

faulty insulin-receptors may prevent the key from opening the cell. The insulin may not work properly, or the pancreas may not produce enough insulin.

Type 2 diabetes was originally referred to as "adult onset" diabetes since it generally didn't occur until later in life. This name is now rarely used as growing numbers of inactive children are developing type 2 diabetes.

In either type 1 or type 2 diabetes, glucose cannot enter the cells and builds up in the blood. Eventually the increased glucose levels in the blood damage small capillaries (small blood vessels) in the body. This can cause a broad array of conditions such as kidney failure, infections that can lead to amputations, increased risk of heart disease, blindness, increased incidence of depression and many other problems.

## How do I know if my blood sugar is high?

Blood sugar levels should always be tested by your doctor.

Two basic tests are:

1. Fasting glucose: the amount of glucose in the blood after not eating for 8 to 10 hours.
2. Glucose tolerance: a measure of how well your body handles a standardized sugary drink.

## What are the symptoms of diabetes?

It is essential that you maintain an open relationship with your physician and can feel comfortable talking with him or her about any symptoms you may be experiencing. Some classic symptoms for diabetes are frequent urination, chronic thirst and increased appetite. You are also at higher risk for developing diabetes if you have high blood pressure, your total cholesterol is 240 or higher, your triglycerides are 250 or higher and/or if someone in your family is diabetic.

## What can I do about my diabetes?

First, see your physician so that he/she can administer the tests necessary to determine if diabetes is a concern for you.

The great news is that type 2 diabetes, which is responsible for 90% of diabetes cases, is preventable or controllable. According to Dr. Steven Blair of the Cooper Institute, head of one of the largest ongoing health studies in the world, "the cause of type 2 diabetes is inactivity." He continues, "I keep challenging physicians: you never see a patient who has been regularly physically active... especially

vigorously active... you just won't see these people develop type 2 diabetes!"

James Barnard, Professor of Physiological Science at the University of California at Los Angeles agrees: "By committing yourself to certain lifestyle changes, you may be able to reduce your need for medication and possibly get off and stay off diabetes drugs for the rest of your life. Plus you may be able to avoid any complications."

In a study done with 5,990 alumni from the University of Pennsylvania, physical activity was shown to provide a protective effect against the development of diabetes. The study also showed the protective effect to be the strongest in the individuals at highest risk.

According to *Prevention Magazine*, "some people with diabetes believe that they can simply adjust their medications to compensate for dietary indiscretions." In fact, says Marie Gelato M.D., Ph.D., Associate Professor of Endocrinology at SUNY Health and Science Center at Stony Brook, "medications are an adjunct to — not a replacement for — a good diet and exercise program."

Even moderate exercise can be enough to help those at high risk from developing type 2 diabetes. Moderate exercise has been shown to assist the body to burn more sugar for energy and increase the cell's sensitivity to insulin, which in return helps to reduce blood sugar levels to a stable level.

In addition, *Physician and Sports Medicine* magazine reported, "Exercise can play a significant role in managing blood glucose levels in women with type 2 diabetes who become pregnant."

Remember it is important to maintain a close, steady relationship with your physician to help you best manage your diabetes with your exercise program and any adjustments to your medication that may be necessary.

## How does cardiovascular exercise help?

For the first time ever researchers found that cardiovascular exercise may dramatically boost a vital protein in humans. This protein helps to clear glucose out of the blood and stabilize escalating glucose levels. The study looked at moderate exercisers versus higher-level exercisers. In 12 weeks both groups saw a 60% increase of this vital