

[IMAGE]

## Winning the Numbers Game

By Ronald Klatz, MD, DO and Robert Goldman, MD

Type 2 diabetes, also known as non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes, accounts for about 90-95 percent of all diagnosed cases of diabetes. In mid-2008, the Centers for Disease Control and Prevention (CDC) announced staggering new statistics on diabetes. The 2007 data show that 24 million Americans, or an unbelievable *8 percent* of the nation's total population, currently have diabetes. What's more, the condition has increased disproportionately among the elderly, as 25 percent of Americans ages 60 years and older are now afflicted.

Diabetes can result in a number of medical complications including heart disease, stroke, hypertension, blindness, kidney disease, nervous-system damage and periodontal disease. People with diabetes are more susceptible to many other illnesses, and once they acquire these illnesses, they often have worse prognoses. Diabetes also multiplies the cost of treating other diseases.

- Copyright © Stock Photo / Register Mark Type 2 diabetes is closely linked to obesity and a sedentary lifestyle. According to the National Institute of Diabetes and Digestive and Kidney Diseases, participants of the Diabetes Prevention Program (a large prevention study of people at high risk for diabetes) who had lifestyle interventions reduced the development of diabetes by 58 percent over a three-year period. The reduction was even greater (71 percent) among adults age 60 or older. Several other studies published in the past 12 months reinforce the notion that by making one or more simple dietary modifications, each of us can significantly reduce our risk of developing type 2 diabetes.

### Think Mediterranean

- Copyright © Stock Photo / Register Mark Staples of the Mediterranean diet include cereals, fruits, legumes, whole grains, fish and olive oil, and numerous studies suggest people who follow the Mediterranean diet live longer and have less heart disease and a reduced risk of cancers. In a recent study, Dr. Martinez-Gonzalez from the University of Navarra (Spain) and colleagues studied 11,380 graduates with no history of diabetes, tracking their dietary habits via food questionnaires. It was generally observed that those subjects who adhered to a Mediterranean diet had a lower risk for type 2 diabetes. Over 4.4 years of

follow-up, participants with the highest adherence to the diet were 83 percent less likely to develop type 2 diabetes compared to those with the lowest adherence. Researchers suggest the Mediterranean diet lowers plasma concentrations of inflammatory markers and markers of endothelial dysfunction, two biomarkers that predict future likelihood of type 2 diabetes.

- Copyright © Stock Photo / Register Mark **Go Green (and Leafy)**

An increased intake of green leafy vegetables may reduce the risk of women developing type 2 diabetes. Specifically, Bazzano and colleagues found that for every additional serving consumed, the risk was slashed by 10 percent. The study involved 71,346 female nurses (ages 38 to 63) who were followed for 18 years. The researchers also found that whole-fruit consumption led to an 18 percent reduction in diabetes risk. Interestingly, fruit juice consumption was associated with an increased risk of diabetes.

### **More Legumes, Less Risk**

Increased consumption of legumes, such as peanuts and soybeans, has been shown to markedly reduce the risk of type 2 diabetes. Raquel Villegas from Vanderbilt University (Tennessee), and colleagues from the Shanghai Cancer Institute followed 64,227 Chinese women for 4.6 years, using questionnaires to assess subjects' dietary patterns. Subjects with a high intake of a variety of legumes had a 38 percent reduction in diabetes risk. In particular, a high intake of soybeans was associated with a 47 percent risk reduction.

### **The Power of Vitamin C**

- Copyright © Stock Photo / Register Mark Previous studies have linked greater consumption of fruit and vegetables with a decreased risk of type 2 diabetes. Anne-Helen Harding and colleagues investigated the correlation between vitamin C levels and type 2 diabetes risk. Over a 12-year period, the team followed 21,831 men and women, (ages 40 to 75 at the study's start), all of whom were participants of the European Prospective Investigation of Cancer (EPIC). The researchers found that men and women with the highest blood levels of vitamin C (at least 1.10 mg/dL and 1.29 mg/dL, respectively) had a 62 percent reduction in the risk of developing type 2 diabetes, as compared to those with the lowest blood levels (less than 0.56 mg/dL for men and 0.77 mg/dL for women). Further, men and women with the highest fruit and vegetable intake (459 g and 550 g per day, respectively) reduced their risk of diabetes onset by 22 percent, as compared to those with the lowest intakes (289 g for men and 382 g for women).

## It's Tea (and Wine) Time

- Copyright © Stock Photo / Register Mark Dietary phenolic compounds, found in high concentrations in red wine and certain teas, may play a role in slowing the passage of carbohydrates into the bloodstream. Kalidas Shetty and colleagues found that red wine inhibits the activity of alpha-glucosidase, an enzyme responsible for triggering the absorption of glucose by the small intestine, by almost 100 percent; black tea extracts produce a 90 percent inhibitory effect. The researchers stated: "It is clear that [red] wines and [some] teas have high antioxidant activity and good inhibitory profiles on [carbohydrate]absorption in the intestine."

Diabetes stands as the seventh leading cause of death in the United States. Overall, the risk for death among people with diabetes is about twice that of people without diabetes of similar age. Financially, it is a costly disease, responsible for an annual health care tab of \$174 billion (direct medical costs and indirect costs including disability, work loss, and premature mortality). The societal costs of the disease are significant as well, since diabetes profoundly impacts individuals and families. Your doctor can evaluate your current dietary and exercise habits, and suggest ways you can minimize your risk of developing diabetes and other weight-related conditions.

## Breaking Down Diabetes

When a food is being digested, enzymes in your stomach break down carbohydrates into glucose, which is then absorbed into your bloodstream. Your pancreas responds by releasing insulin, which allows glucose to travel to the liver, where it is distributed to cells for energy. Excess glucose is stored as glycogen and reconverted to glucose if blood sugar levels fall and more energy is required. In general, this is the normal, healthy picture of the blood glucose response.

With type 1 diabetes, the pancreas doesn't secrete insulin at all. As a result, glucose has no way of getting into the body's cells, and blood sugar levels stay high. With type 2 diabetes, the pancreas secretes insulin, but not enough to meet your body's needs. In both cases, glucose builds up in your bloodstream.

Normal Blood Glucose Response - Copyright © Stock Photo / Register Mark  
**Normal Blood Glucose Response**

The pancreas produces adequate insulin to transport glucose from the bloodstream.

Abnormal Response (Diabetes) - Copyright © Stock Photo / Register Mark  
**Abnormal Response (Diabetes)**

The pancreas produces inadequate or no insulin, leaving glucose in the bloodstream.

Normal blood glucose levels range between 60 mg/dL and 120 mg/dL; however, these levels generally are much higher in diabetics. Because glucose stays in the bloodstream, rather than being made available to cells, diabetics can suffer a variety of health problems, including poor circulation and blood flow. Among the worst potential complications are nerve damage, blindness, cardiovascular disease and stroke.

How Food Becomes Functional - Copyright © Stock Photo / Register Mark

### **How Food Becomes Functional**

Carbs break down into glucose and are absorbed into the bloodstream. The pancreas releases insulin, which helps transport glucose to the liver, where it is distributed to cells for energy.

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