

There is some suggestive but not conclusive evidence that correlates consumption of salt-pickled, salt-cured, and smoked foods with stomach and esophageal cancers, indicating that the public should continue to limit its intake of these foods to the current low levels of consumption.

#### **Special Populations**

Persons at high risk for diet-related cancers because of family history, obesity, or excessive alcohol intake should receive counseling from qualified health professionals to design approaches that could reduce their elevated risk for cancer.

Patients with cancer should receive appropriate nutritional support and dietary advice to maintain optimal nutritional status throughout medical, surgical, or radiological therapy. There is no credible evidence that nutritional changes specifically help in the cure of cancer patients.

Children and older persons are not currently targeted by the dietary guidelines relative to cancer risk due to limited data for these groups.

#### **Nutrition Programs and Services**

##### **Food Labels**

Evidence related to the role of dietary factors in cancer suggests that food manufacturers should include on package labels information about nutritional content of the food, especially for fat and carbohydrate components (and including fiber components to the extent permitted by analytical methods).

##### **Food Services**

Evidence related to the possible role of dietary factors in cancer suggests that the public might benefit from increased availability of foods low in fat and high in fiber.

##### **Food Products**

Evidence related to the role of dietary factors in cancer suggests that foods low or reduced in calories and fat and high in fiber should be made increasingly available by food manufacturers.

##### **Special Populations**

Persons with cancer should be provided with counseling and assistance in the development of diets appropriate to their condition.

## **Research and Surveillance**

Research and surveillance issues of special priority related to the role of diet in cancer should include investigations into:

- Molecular mechanisms of carcinogenesis and the ways in which initiating or promoting events may be affected by specific components of dietary fat, fiber, protein, alcohol, vitamin A, carotenoids, and other vitamins or minerals.
- Quantitative relationships between food and nutrient intake and cancer incidence through chemoprevention and dietary clinical trials.
- The effect of specific components of dietary fat, fiber, vitamin A, and carotenoids on cancer etiology.
- Interactions between dietary factors such as fat, fiber, calories, protein, and specific vitamins and minerals in cancer prevention and causation.
- Development of biochemical markers of dietary intake to better monitor effects of dietary intervention on cancer risk.
- Patterns of food intake best associated with cancer prevention.
- Development of national population data on food and nutrient consumption patterns and specific cancer rates, including more accurate assessment of intake of specific dietary factors within relatively homogeneous population groups.
- Levels of carcinogenic and mutagenic substances in the food supply.
- Dietary guidance methods that are most effective in helping people improve patterns of food intake.
- The causes of wasting and malnutrition in cancer patients and the effects of nutritional support on response to therapy and survival in these patients.

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## Chapter 5

# Diabetes

. . . urine wonderfully sweet, as if imbued  
with honey or sugar.

Thomas Willis, physician to  
Charles II of England, 1670

### Introduction

Diabetes mellitus (commonly called diabetes) is the name given to a spectrum of conditions found in 11 million Americans. Diabetes is characterized by metabolic abnormalities (of which the most evident is hyperglycemia, an elevated concentration of glucose in blood) and by long-term complications involving multiple organs, especially the eyes, kidneys, nerves, and blood vessels. These complications result from a deficiency of the hormone insulin, a reduction in the effectiveness of insulin, or other less well understood metabolic disorders. There are two major forms of diabetes mellitus: Type I, or insulin-dependent, and Type II, or noninsulin-dependent. These types are distinguished by the need in Type I diabetes for exogenous replacement of insulin, which is necessary for the metabolism of glucose. The treatment goal for both types of diabetes is to prevent or reduce the risk and severity of complications; generally this goal is best achieved by maintaining normal or near-normal blood glucose and blood lipid levels. In longstanding diabetes, certain other aims of treatment assume great importance, including blood pressure control and reducing protein load on the kidney (see the following section and the chapter on kidney diseases).

Type I diabetes, or insulin-dependent diabetes mellitus (IDDM), formerly known as juvenile-onset diabetes, accounts for about 10 percent of diabetes in the United States. It is characterized by an absolute deficiency of insulin, caused by beta-cell destruction of the islets of Langerhans in the pancreas. Genetic factors, including an autoimmune response (Eisenbarth 1986), affect the risk of beta-cell destruction as well as environmental factors such as viral agents or cytotoxic chemicals (Arky 1983).

Type I diabetes usually appears before age 40 and begins abruptly. Typical symptoms are thirst, excessive urination, increased appetite, rapid weight loss, breath that smells of acetone, and urine that is sweet because of its high sugar concentration. Affected persons are usually of normal body weight. Because their insulin levels are low, persons with Type I diabetes require insulin for survival. Treatment usually includes administration of insulin, diet coordinated with the insulin dosage schedule, and regular physical exercise. At present, no method to prevent development of this form of the disease has been identified (Browner 1986).

Type II diabetes, or noninsulin-dependent diabetes mellitus (NIDDM), also known as adult- or maturity-onset diabetes, accounts for approximately 90 percent of all cases and affects at least 10 million Americans. It usually appears in mid-life, most commonly among people who are overweight or obese. Its onset is gradual, and many persons have a long history of mild symptoms or display no symptoms at all. Often, the condition is first diagnosed among individuals with no overt symptoms who display elevated fasting blood glucose levels during a routine physical examination. Genetic predisposition appears to play an important role in Type II as well as in Type I diabetes.

Persons with Type II diabetes may display normal pancreatic histology, secrete insulin in response to glucose ingestion, and have normal levels of insulin in their blood. But because the body is less able to use this insulin, or perhaps for some other as yet unknown reason (Feldberg, Pyke, and Stubbs 1985), blood sugar levels are inappropriately high, and insulin levels are insufficient. The three principal approaches to diabetes management are diet, exercise, and treatment with oral antidiabetic agents or insulin. Overweight persons able to lose weight can be managed by diet and exercise alone. Some individuals unable to lose weight may respond to treatment with sulfonylurea and other antidiabetic, hypoglycemic drugs (agents that reduce blood sugar levels), but others will need insulin treatment to control their diabetes.

Although it is generally believed that maintenance of normal blood glucose levels will prevent or reduce the complications and premature mortality associated with diabetes, this supposition has yet to be proved.

### **Historical Perspective**

Since ancient times, diet has been recognized as a cornerstone of diabetes management, yet ideas about the most effective dietary treatment have varied widely throughout history (Bierman 1979). The uncertainty has