THIN Diabetes, **FAT Diabetes**

Prevent Type 1
and
Cure Type 2

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Disclaimer

I am a science writer. I am not your doctor. If you have any questions about your own health or about what you should eat, please see a licensed healthcare professional. If you have food allergies or intolerances or any metabolic disease or are taking any prescription medications, talk to your healthcare provider before you make any major change in diet. Diabetics who make a major change in diet without adjusting their prescription medicine can end up hospitalized or dead from low blood sugar.

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Introduction

When people talk about diabetes (diabetes mellitus), they could mean any of several different diseases, all of which produce high blood sugar. Many people and even many doctors think that people with diabetes should avoid eating carbohydrates (sugars and starches). In reality, a starchy, low-fat diet is good for anyone with any form of diabetes mellitus, and it can cure the most common form.

Diabetes mellitus, which is usually just called diabetes, is a medical term that can refer to any of several different diseases. Each of these diseases has a different cause, but all of them have one thing in common. If left untreated, they cause a sugar called glucose to build up to toxic levels in the bloodstream. Some of that glucose in the blood came from the carbohydrates (sugars and starches) that the person ate. However, the body can also make glucose out of other things, such as protein. (That's why people can have sugar in their blood even if they eat no starch or sugar at all.) People **don't** get diabetes mellitus from eating too much starch and sugar. In fact, **diabetics need to eat a high-carbohydrate diet**. Instead, diabetes mellitus means that **the body has lost control over its blood chemistry**.

Blood sugar is a Goldilocks and the Three Bears type of problem. Having too much sugar in the blood can kill you. So can having too little sugar in the blood. A healthy person's body has a control system that normally keeps the blood sugar level just right (Figure 1). Diabetes means that something has gone wrong with this control system.

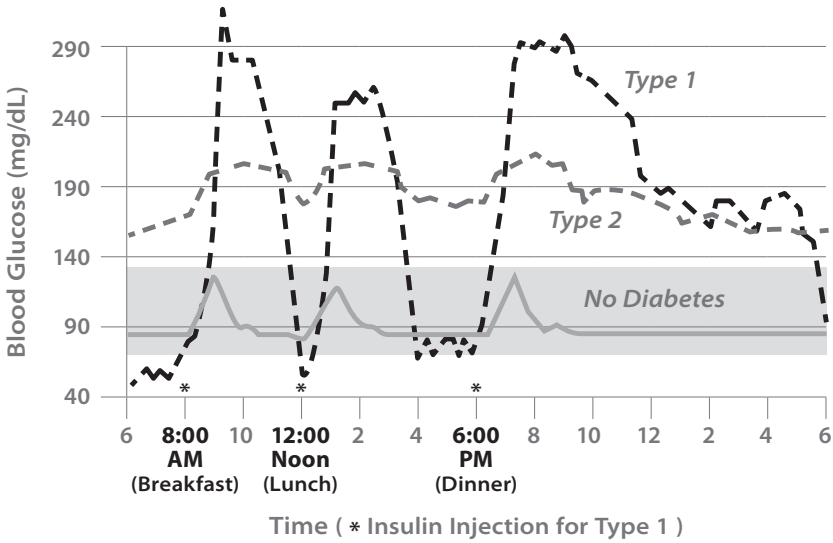

Figure 1. In a healthy person, blood sugar levels stay within the normal range pretty much all the time. Type 1 diabetes (thin diabetes) results from the failure of the pancreas to provide insulin. To stay alive, people with thin diabetes must get insulin by injection. (Unfortunately, nobody can do as good a job as a normal pancreas at injecting exactly the right amount of insulin at exactly the right time.) Type 2 diabetes results from the body's resistance to the effects of insulin. A person can have thin diabetes and fat diabetes at the same time.

Several things can go wrong with the body's system of controlling blood sugar. That's why there's more than one type of diabetes. Unfortunately, a person can have more than one of these problems at the same time. That's why people with diabetes need to understand all of the different types of diabetes (Table 1).

Most English-speaking people are confused by the names for the different types of diabetes. French-speaking people have no such confusion. They use the term *thin diabetes* (*diabète maigre*) to refer to the severe form of diabetes that tends to happen in children who are usually thin to begin with and who lose weight rapidly if the disease goes untreated. This form of diabetes used to be called juvenile diabetes because it often occurs in children. However, it can start at any age. Mary Tyler Moore was 33 years old when she got "juvenile" diabetes.

Thin diabetes is the form of diabetes that was always fatal in the days before insulin therapy. As a result, it has been called insulin-dependent diabetes. American doctors now call it type 1 diabetes.

Table 1. The main types of diabetes mellitus.

Type of Diabetes	Cause	Other Names
Thin Diabetes	Lack of insulin, usually after the immune system has destroyed the insulin-producing cells of the pancreas but sometimes after removal of the pancreas.	Type 1 diabetes, juvenile diabetes, insulin-dependent diabetes (IDDM), pancreatic diabetes, latent autoimmune diabetes of adults (slowly developing cases).
Fat Diabetes	Resistance to the effects of the hormone insulin, in overweight people who eat a fatty diet.	Type 2 diabetes, adult-onset diabetes, non–insulin-dependent diabetes (NIDDM).
Gestational Diabetes	Temporary resistance to the effects of insulin during pregnancy.	—
Genetic Diabetes	A genetic defect that leads to low insulin production or poor sensitivity to insulin.	Monogenic diabetes; there are several different kinds, including infantile-onset diabetes and maturity-onset diabetes of the young (MODY).

French-speaking people use the term *fat diabetes* (*diabète gras*) to refer to the relatively mild type of diabetes that occurs in overweight people and that can be cured by losing weight. This form of diabetes has been called adult-onset diabetes. But now that there are so many overweight children, pediatricians are seeing more cases of fat diabetes than thin diabetes among children. Fat diabetes has also been called non–insulin-dependent diabetes. But that term became confusing because so many people with fat diabetes are now taking insulin. American doctors now call it type 2 diabetes. A temporary case of fat diabetes that occurs during pregnancy is called gestational diabetes.

Most people with diabetes believe that their diabetes is genetic, which to them means that they were doomed to get it. However, studies of identical twins show us that genes play only a small role in the cause of thin diabetes and fat diabetes. Only a few, rare forms of diabetes are really due to a bad gene. Most of the truly genetic forms of diabetes are called monogenic diabetes because they can be linked to a mutation in one particular gene. Some of these genetic forms of diabetes are so mild that they are often mistaken for fat diabetes, if they are diagnosed at all. These mild forms are often easily managed with diet or pills. Other forms of genetic diabetes are so severe that they are easily mistaken for thin diabetes. These severe forms of genetic diabetes must be managed with insulin therapy, just like thin diabetes.

In a fasting person, blood glucose normally stays between 70 and 100 milligrams per deciliter (mg/dL). To qualify for a diagnosis of diabetes mellitus, a patient has to meet at least 1 of the following criteria:

- A glycated hemoglobin level (HbA_{1c}) of at least 6.5% (for an explanation of HbA_{1c}, see chapter 12).
- A blood sugar level of at least 126 mg/dL in a blood sample taken when the patient is fasting (i.e., has not eaten anything for at least 8 hours).
- A blood glucose level of at least 200 mg/dL during a glucose tolerance test (see chapter 4).
- A blood glucose level of at least 200 mg/dL in a "casual" blood sample (i.e., a blood sample taken without regard to when the patient ate last).

Patients whose fasting glucose is between 100 and 125 mg/dL are said to have "prediabetes." They are considered to be at risk of developing thin diabetes or fat diabetes.

To figure out what kind of diabetes mellitus the patient has, doctors use other kinds of tests. To see whether the pancreas is making insulin, doctors measure the amount of insulin and C-peptide (a protein that is made along with insulin) in the blood. The doctor can also test the patient for the antibodies that attack the pancreas. Patients who

have low insulin production but no antibodies to their pancreas may have one of the genetic forms of diabetes, which I describe in chapter 16. Note that you can have more than one type of diabetes at the same time. People with thin diabetes or one of the rare genetic forms of diabetes can also have some degree of insulin resistance.

The goal in managing fat diabetes should be to cure the fat diabetes by correcting the diet. Fat diabetes is not really a disease. It is a defense against weight gain. Fat diabetes is actually a way for the body to resist gaining even more weight from a fattening, fatty diet. When people with fat diabetes switch to a low-fat (<10% of calories), high-fiber, high-carbohydrate diet, the fat diabetes goes away, even if they eat enough food to feel full.

Unfortunately, there is no cure for thin diabetes. However, there's a good chance that many cases could be prevented. As I explain in chapter 11, thin diabetes can be triggered by a protein in cow's milk. Simply removing animal milk from the diet could dramatically reduce the number of new cases of thin diabetes.

For people with the incurable forms of diabetes, the goal should be to keep blood sugar within a reasonable range. In the short run, severely high or low blood sugar can lead to sudden death. In the long run, even moderately high blood sugar can increase the risk of complications, such as blindness.

Dietary therapy is the key to managing any metabolic disease, including diabetes. The appropriate diet for someone with any form of diabetes is a low-fat, purely plant-based (vegan) diet. This kind of diet cures fat diabetes. It also gives people with the incurable forms of diabetes the best possible chance for long-term survival with healthy eyes, feet, and kidneys. Such a diet provides enough of all of the essential nutrients except for vitamin D (which you can get by exposing your skin to sunshine) and vitamin B_{12} (which comes from bacteria). The only supplement that is routinely recommended for people on this kind of diet is vitamin B_{12}.

The diet should be based on unrefined starches: whole grains or starchy vegetables, such as potatoes or sweet potatoes. The diet should include lots of vegetables and fruit. However, the person with diabetes

should not eat any meats, dairy foods, fish, eggs, or foods that contain oil or shortening. In other words, diabetics should not eat anything that came from an animal. They should also avoid any concentrated fats and oils, even the supposedly healthy oils such as olive oil and canola oil (Table 2).

Table 2. Foods for people with diabetes to eat or avoid.

Eat	• Whole grains, including brown rice, whole wheat, corn, quinoa, buckwheat, etc. • Starchy vegetables, including potatoes, sweet potatoes, winter squashes, and cassava • Other vegetables • Fruits • Beans and peas and lentils (legumes)
Do Not Eat	• Meat • Fish • Dairy foods (milk, yogurt, cheese, butter) • Eggs • Oils (including olive oil and canola oil) and foods made with oil or shortening

The diet that is good for diabetics is also good for people who do not have diabetes. It helps them lose excess weight without feeling hungry. It cleans out their arteries and eliminates their risk of heart attack. It reduces their blood pressure and with it their risk of stroke. It decreases their risk of cancer and osteoporosis and autoimmune disease and Alzheimer's disease. Thus, if a family changes its diet to help a diabetic family member, everyone can benefit.

Many people who are eating the rich and fatty standard American diet suffer from high blood sugar and high blood pressure. Many of those people are taking prescription drugs to reduce their blood sugar and blood pressure. If they change to a healthy diet, they can stop taking most of those medications. But if they make a sudden change in diet while taking those medications, they could faint from low blood pressure or even die from low blood sugar. That's why people who are

sick or who are taking any prescription medication should talk to their healthcare professional before making any major change in diet.

Most people are surprised to hear that the most common form of diabetes is curable. They are even more surprised to hear that diabetics should eat lots of starchy foods, such as rice, bread, and potatoes. Most diabetics have been told to limit their intake of starchy foods because starch gets broken down into glucose. Why am I telling them something that is so different from what they have read on the Internet, or even from what they have heard from their doctor?

I became interested in diabetes when I was a teenager, after my grandmother got a diagnosis of what she called sugar diabetes. She eventually died of complications of her diabetes. Since then, I have met many other people with various types of diabetes. I have known several people who eventually died because of their diabetes. I have also met people who have lost their eyesight or their feet or needed a kidney transplant because of diabetes. Clearly, something had to be done to stop all this preventable death and suffering.

I learned a lot about diabetes from working as an editor in medical publishing. I learned a lot about nutrition and dietetics from working on nutrition textbooks. I also learned a lot about diabetes from working for a veterinary journal. Many dogs and cats get diabetes. Diabetes in a dog or a cat is a lot like diabetes in a human being. The insulin products that veterinarians prescribe for diabetic dogs and cats were actually made for human beings with diabetes. Diabetic dogs and cats can also suffer from the same kinds of complications as human diabetics, such as diabetic ketoacidosis. The treatment for those complications is pretty much the same for a dog or a cat as it is for a human being. However, I was originally told that there was one important difference. Fat diabetes in a cat would go away if the cat lost weight. To my delight, I found that fat diabetes in a human being can also be cured by weight loss. It can be cured even faster if the person switches from a fatty diet to a starchy diet.

I wrote this book because 30 million people in the United States have diabetes. Diabetes is our seventh leading cause of death in the

United States, and it does not have to be. Diabetes is also our leading cause of new cases of blindness, and it is the main medical reason for people to lose their feet. Diabetes is also a major cause of kidney failure. It increases the person's risk of heart attack, stroke, liver disease, cancer, osteoporosis, and Alzheimer's disease. Yet these deaths and this suffering could be prevented if people understood how to cure fat diabetes and prevent thin diabetes. People are not being told how to cure their fat diabetes. Nor are parents being told about the role of cow's milk in causing thin diabetes. People with thin diabetes are not being told about the value of a low-fat, high-carbohydrate diet for preventing complications. All of these facts are clearly documented in the scientific literature, but few laymen know them.

Even many medical doctors have been misinformed about nutrition and diabetes. There are two reasons for this problem. One is the neglect of nutrition in medical schools. For decades, medical schools in the United States have been neglecting nutrition and dietetics. The American Medical Association issued reports about this problem in the 1960s and 1970s. The National Academy of Sciences issued its own report in 1985. The American Society for Clinical Nutrition published yet another report in 2006. It's a chronic problem that is not going away by itself. If the medical profession does not solve this problem, then public health activists will have to solve it.

The other problem was simply awkward timing. Insulin was discovered in 1921. As a result, much of the important research on diet for people with diabetes was done in the 1920s through the 1950s. Unfortunately, PubMed, which is a computerized database of medical journal articles, originally went back only to 1966. As a result, doctors could easily find the reports of the studies of the new diabetes drugs but remained largely unaware of the important dietary studies. One of the goals of this book is to let doctors and patients know about the important dietary research from the 1920s through the 1950s.

Today, most doctors focus on the blood sugar and ignore the fat in the diet. They tell their patients to avoid eating sugars and starches, to keep their blood sugar from going too high. Yet that means that the patients will get a high percentage of their calories from fat.

Unfortunately, this fatty diet that doctors are urging their patients to eat can actually **make the fat diabetes worse**. It can also cause fat diabetes in someone with thin diabetes.

Doctors use prescription drugs to control the blood sugar in patients with fat diabetes. Unfortunately, when doctors make heavy use of those drugs to get really tight control of the patient's blood sugar, the patient's risk of death actually goes up. Instead, doctors should be teaching their patients with fat diabetes how to cure their diabetes by changing their diet.

Many of the things that I say in this book go against conventional wisdom. But you do not have to take my word for any of them. My goal in writing this book is to give you enough background knowledge about the history and biology of diabetes that you can figure out for yourself who is telling the truth. Diabetes has been a mystery since ancient times. In this book, I explain how that mystery was solved. Then you shall know the truth, and the truth shall set you free.

Summary

- The term *diabetes mellitus* refers to any of several diseases that cause sugar to build up in the bloodstream. It can refer to thin diabetes, fat diabetes, gestational diabetes, or monogenic diabetes.
- Thin diabetes is a severe, incurable disease that results from failure of the pancreas to produce insulin. It must be treated with insulin replacement. It has also been called juvenile diabetes, insulin-dependent diabetes, and type 1 diabetes.
- Fat diabetes is a milder problem that results from resistance to the effects of insulin. It has been called adult-onset diabetes, non–insulin-dependent diabetes, and type 2 diabetes. It can be cured by eating a low-fat, starchy diet.
- The same low-fat, starchy diet that cures fat diabetes and gestational diabetes is good for people with thin diabetes.
- The truly genetic forms of diabetes account for only about 2% of all cases of diabetes.

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The Pissing Evil

For thousands of years, doctors knew about a disease that seemed to cause the body to melt into urine. The traditional English name for it was the pissing evil. The severe form that struck in childhood was rapidly fatal, regardless of treatment. The mild form that occurred in overweight adults could be cured by eating less and exercising more.

In his song *Wonderful World*, Sam Cooke sang, "[I] don't know much about history, don't know much biology." But to understand diabetes, you need to know its history and its biology. The best place to start is with its ancient history. Diabetes has been around for thousands of years. We know that because the obvious signs of diabetes were clearly described in writings that are thousands of years old.

People with uncontrolled diabetes pee a lot. They lose so much water that they become terribly thirsty. Their urine has sugar in it. Because they are losing all that sugar in their urine, and the sugar represents calories, they end up losing weight. To an ancient doctor, it seemed as if the patient's body was melting into urine. That's why the traditional English name for diabetes was the pissing evil. In medieval Japan, diabetes mellitus was called *shoukachi*, which means the thirst disease. The ancient Sanskrit word for diabetes is *madhumeha*, which means honey urine.

The most evil form of the pissing evil tended to strike young people, mainly children. It made them horribly sick. They always died

within a matter of days or weeks after they fell ill. There was no cure, nor was there any effective treatment. In contrast, the older, fatter people with the mild form of the disease got better if they simply ate less and exercised more.

Today, we know that when someone has way too much sugar in the blood, the excess sugar starts to leak out through the kidneys, drawing a lot of water with it. As a result, the person passes huge volumes of sweet urine. That production of huge volumes of urine is called polyuria, which simply means too much urine. The presence of glucose in the urine is called glycosuria.

Of course, when people lose that much water through their kidneys, they become dehydrated. As a result, they get thirsty and drink huge amounts of water. Excessive thirst is called polydipsia, which comes from the Greek word for drinking too much. Since the sugar that is being lost through the kidneys represents calories, the person loses weight.

The loss of sugar and water through the kidneys explains how high blood sugar causes the classic signs of uncontrolled diabetes mellitus: frequent urination, sugar in the urine, severe thirst, and weight loss. In severe cases, the person's breath develops a peculiar fruity smell. This odor is the result of ketosis, which I'll describe in more detail in chapter 5.

An Egyptian papyrus that is about 3500 years old describes the problem of abnormally frequent urination. An Indian medical text from about 600 BC described a problem called *madhumeha* (honey urine). This problem was common among fat, inactive people. It could be cured by exercise. In other words, it was clearly a disease of the rich. Those rich people were suffering from what is now called type 2 diabetes mellitus—fat diabetes. Fat diabetes is the form of diabetes that has become so common in the United States today.

Until recently, fat diabetes was a disease of the rich. It struck the people who could afford to eat lots of fatty foods and processed foods and didn't burn off those extra calories in heavy physical labor. Today, fatty foods and processed foods have become so cheap that lots of working class people are eating them. As a result, we are seeing fat

diabetes among working class people. As people in Africa and Asia began eating more like Americans, cases of fat diabetes started to appear in those populations.

The term *diabetes* was reportedly coined by the Greek physician Apollonius of Memphis (Egypt) in the third century BC. The best ancient clinical description of diabetes was written in the first century of the Common Era, by the Greek physician Aretaeus of Cappadocia (now in Turkey). Here is his vivid description of the disease:

> Diabetes is a remarkable affliction, not very frequent among men … The course is the common one, namely, the kidneys and the bladder; for the patients never stop making water, but the flow is incessant, as if from the opening of aqueducts … The nature of the disease, then, is chronic, and it takes a long period to form; but the patient is short-lived, if the constitution of the disease be completely established; for the melting is rapid, the death speedy. Moreover, life is disgusting and painful; thirst, unquenchable; excessive drinking, which, however, is disproportionate to the large quantity of urine, for more urine is passed; and one cannot stop them either from drinking or making water. Or if for a time they abstain from drinking, their mouth becomes parched and their body dry; the viscera seem as if scorched up; they are affected with nausea, restlessness, and a burning thirst; and at no distant term they expire. They thirst, as if scorched up with fire … But if it increases still more, the heat is small indeed, but pungent, and seated in the intestines; the abdomen is shriveled, the veins protuberant, and there is general emaciation, when the quantity of urine and the thirst have already increased; and when, at the same time, the sensation appears at the extremity of the member, the patients immediately make water. Hence, the disease appears to me to have got the name diabetes as if from the Greek word διαβητής (which signifies a siphon), because the fluid does not remain in the body, but uses the man's body as a ladder, whereby to leave it. They survive not for long, for

> they pass urine with pain, and the emaciation is dreadful; nor does any great portion of the drink get into the system, and many parts of the flesh pass out along with the urine.

In 1769, a British physician named William Cullen published an elaborate classification of human diseases. He drew a careful distinction between the two kinds of problems that result in the overproduction of urine. One kind of problem resulted in urine that had the smell, color, and flavor of honey. He called it diabetes mellitus, which means honeyed diabetes. The other kind of problem produced urine that was so dilute that it was flavorless. He called it diabetes insipidus, or flavorless diabetes.

By the middle of the 19th century, it was clear that diabetes insipidus could result from injury to the brain. Today, we know that diabetes insipidus can result from any of several problems. Some cases result from damage to the thirst mechanism in the brain. As a result, the person feels abnormally thirsty and ends up drinking way too much water. Often, the only solution is to limit the patient's access to water.

The other forms of diabetes insipidus result from some problem with antidiuretic hormone (ADH), which is the hormone that tells the kidneys to retain water. Either the brain is failing to produce ADH, or the ADH is getting broken down before it can have its effect, or the kidneys are simply not responding to ADH. The treatment of those forms of diabetes insipidus depends on the cause. If the problem is a shortage of ADH, the patient can be given pills that contain a synthetic version of ADH. If the problem is in the kidney, then the goal is to remove the underlying cause, if possible, while managing the patient's salt and water balance.

Although the ancient Greeks believed that diabetes mellitus was a disease of the kidneys, a British anatomist named Thomas Willis declared in 1674 that it was actually a disease of the blood. Another British physician from the same era, Thomas Sydenham, clarified the problem further. He argued that diabetes mellitus results from some failure of digestion. He was almost right. Today, diabetes mellitus is considered to be a disease of the metabolism.

In 1776, a British physician named Matthew Dobson showed that people with diabetes really do have too much sugar in their urine. He took the urine from diabetic patients and boiled off the water. He was left with a crumbly brown residue that looked like brown sugar. It clearly contained sugar, but Dobson had no way of knowing what kind of sugar it was. In 1815, a French chemist showed that the sugar in diabetic urine is chemically identical to a sugar that is found in grapes. Today, we call it glucose. In contrast, the sugar that is in our sugar bowls is sucrose (Figure 2). The starches that we eat are made up of long chains of glucose molecules.

Figure 2. A molecule of sucrose (table sugar) is made up of one glucose molecule bound to a fructose molecule. Starches are made out of long chains of glucose molecules. During digestion, sucrose quickly breaks down into glucose and fructose. Starches are broken down into pure glucose.

Dobson noted that there are two basic kinds of diabetes mellitus. One kind was always fatal within about a month. The other was a much milder, chronic condition. Thus, he could clearly see the difference between what we now call type 1 and type 2 diabetes. These two conditions are completely different diseases whose symptoms overlap.

The dietary management of diabetes was pioneered in Britain in the 1790s by John Rollo, who was the Surgeon General of the Royal Artillery. Back then, there were no laboratory tests for sugar in the urine or the blood. So Rollo used Dobson's method. He had his patients

collect all of the urine that they produced in a day. Then Rollo had an apothecary boil off the water and weigh the cake of sugar that resulted. This method allowed Rollo to measure the amount of sugar that the patient was excreting. Sometimes, Rollo simply added a bit of yeast to a patient's urine sample. The more sugar the urine contained, the more foam the yeast would produce.

One of Rollo's patients was Captain Meredith, a fat artillery officer who had a severe case of what we now call type 2 diabetes. When Meredith ate "vegetable" foods (e.g., breads, grains, or fruits), he passed a lot of sugar in his urine. When Meredith ate nothing but "animal" matter (i.e., meat), less sugar appeared in his urine. From these findings, Rollo decided that diabetes was the result of a disease of the stomach. He thought that the diabetic patient's stomach was producing too much sugar from vegetable matter. Rollo suspected that his diabetic patients had too much sugar in the blood. However, he had no way of measuring blood sugar levels.

Since Rollo thought that diabetes mellitus resulted from the stomach making too much sugar out of starch, he decided that the patient should eat meat instead of bread. In other words, Rollo recommended a low-carbohydrate diet, like the modern-day Atkins diet. Unfortunately, Rollo did not realize that he was urging Captain Meredith to eat the fatty foods that had caused his diabetes to begin with. If Rollo had persuaded Captain Meredith to eat bread and vegetables and fruit instead of meats and fats, Meredith would have lost weight and the fat diabetes would have cured itself.

Today, we know that diabetes is *not* a disease of the stomach. Nor is diabetes caused by eating a high-carbohydrate diet. Diabetes has always been rare in populations that eat a high-carbohydrate diet. We also know that a high-carbohydrate diet is the best way to manage diabetes.

In 1835, a French chemist named Apollinaire Bouchardat began a long series of studies of diabetes. Like Rollo, he recommended a low-carbohydrate diet. To that, he added a regimen of heavy exercise. Bouchardat found that the milder, chronic form of diabetes responded well to eating less and exercising more. In contrast, the people with

the severe form of diabetes could not tolerate exercise and did not seem to respond to the diet.

By the 1870s, doctors in Europe had started doing autopsies on diabetic patients. The autopsies revealed that people who had died of thin diabetes usually had obvious damage to the pancreas. The damage was often severe enough to be seen with the naked eye. Thus, Bouchardat concluded that thin diabetes was due to a disease of the pancreas. In contrast, the pancreas of someone who had had the milder, chronic form of diabetes usually looked perfectly normal. However, the liver might be enlarged and fatty. Scientists already knew that the liver had something to do with sugar metabolism. Some of the sugar that is found in the blood seemed to come from a starchy substance called glycogen, which is stored in the liver. Also, the problem of sugar in the urine sometimes went away if someone with fat diabetes got cirrhosis of the liver. Today, we understand that a failing liver cannot store much glycogen or make much sugar out of other substances, such as protein.

Another Frenchman, a physician named Étienne Lancereaux, coined the term *diabète maigre* (thin diabetes) to refer to the severe form of diabetes. Thin diabetes usually struck people who were of normal weight to begin with, often in childhood. Lancereaux also coined the term *diabète gras* (fat diabetes) to refer to the milder, chronic form of diabetes that tended to occur in overweight people.

Thus, by the turn of the 20th century, it was clear that there were two different kinds of diabetes mellitus. Fat diabetes was a relatively mild, chronic disorder that could be cured by eating less and exercising more. Thin diabetes, in contrast, was a deadly, incurable disease that could strike people of normal weight, often during childhood. It was a catastrophe. It always killed the patients within a matter of weeks, regardless of treatment. Thin diabetes, but not fat diabetes, was related to disease of the pancreas.

In the early 20th century, some American physicians found that they could prolong the short, miserable lives of patients with thin diabetes by putting them on a low-carbohydrate starvation diet. The goal was to allow the patient to starve to death slowly, rather than

developing diabetic ketoacidosis (which I'll describe in chapter 13) and dying within a matter of days to weeks.

The starvation diet was a horrible ordeal, but it allowed a few patients to survive until insulin therapy became available. The most famous of these patients was Elizabeth Hughes, the daughter of Charles Evans Hughes, who served as governor of New York, ran for President in 1916, and eventually served as Chief Justice of the United States.

When Elizabeth Hughes got thin diabetes at age 11 in 1919, she was just under 5 feet tall and weighed 75 pounds. Dr. Frederick Allen had her fast for a week and then begin a diet of only 500 calories per day, with one fast day per week. After she lost 20 pounds, she stopped passing sugar in her urine. Then, she was allowed to eat 1250 calories per day, except on her weekly fast day, and her weight went back up to 60 pounds. Although Elizabeth's diet was carefully supervised by a nurse, her condition continued to deteriorate in the winter of 1921-1922, and her weight dropped to 45 pounds. At that point, she was enrolled in a trial of a new miracle drug, insulin.

Insulin therapy saved her life. Thanks to insulin, Elizabeth Hughes was able to live a long and productive life. She was graduated from Barnard College. She married and had three children. She became prominent in civic life. She eventually died of pneumonia in 1981. At the time of her death, she had been taking insulin for 58 years. Few of her friends ever knew that she had diabetes.

Summary

- The term *diabetes mellitus* refers to several unrelated diseases that all lead to the buildup of sugar in the blood. This sugar then leaks through the kidneys, taking water with it. Thus, high blood sugar causes the classic signs of diabetes: overproduction of abnormally sweet urine, heavy thirst, and weight loss.
- Thin diabetes (type 1 diabetes mellitus) results from failure of the pancreas to produce the hormone called insulin. Until the development of insulin replacement therapy, thin diabetes was always rapidly fatal.

- Fat diabetes (type 2 diabetes mellitus) used to be a disease of the wealthy. It results from eating a rich, fatty diet. Eating a starchy, low-fat, high-fiber diet solves the problem.
- Diabetes insipidus results from failure of the body to retain water. It has nothing to do with diabetes mellitus, although both diseases cause the person to pee a lot.

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About the Author

In *Thin Diabetes, Fat Diabetes*, Laurie Endicott Thomas provides the simple yet powerful lessons about nutrition and medicine that she has learned through working as an editor in medical, veterinary, and academic publishing for more than 25 years. Thomas has a master's degree from the University of Pennsylvania, and she is certified by the Board of Editors in the Life Sciences. She also writes a grammar column for the *American Medical Writers Association Journal*. Her research for those columns gave rise to her first book, *Not Trivial: How Studying the Traditional Liberal Arts Can Set You Free*. The title is an allusion to the classical trivium of grammar, logic, and rhetoric. These studies were originally called liberal arts because they were considered appropriate for freeborn men, as opposed to slaves.

She also maintains the following Web sites:

www.nottrivialbook.com
www.thindiabetes.com
www.gorillaprotein.com
www.nomeasles.com

Support Diabetes Research and Education

The following organizations are supporting important clinical research on the dietary management of diabetes or other chronic diseases. They also provide valuable information to the public. They need your help. Please give generously.

Physicians Committee for Responsible Medicine
5100 Wisconsin Ave., N.W., Suite 400
Washington DC, 20016
www.pcrm.org

The McDougall Research & Education Foundation
P.O. Box 14039
Santa Rosa, CA 95402
www.drmcdougall.com