DR. BERNSTEIN'S

DIABETES SOLUTION

A COMPLETE GUIDE TO ACHIEVING NORMAL BLOOD SUGARS

Chapter 9: The Basic Food Groups, or Much of What You Have Been Taught About Diet is Probably Wrong

In Chapter 1 we discussed generally how diabetics and nondiabetics might react to a particular meal. Here we'll talk about how the specific kinds of foods can affect your blood sugar. Perhaps the most curious fact about diet, nutrition, and medication is that while we can make accurate generalizations about how most of us will react to a particular diet or medical regimen, each individual will react somewhat differently to a given food.

The foods we consume, once you take away the water and undigestible contents, can be grouped into three major categories: protein, carbohydrate, and fat. Seldom is food from one of these major groups solely one type of nutrient. Protein foods often contain fat; carbohydrate foods frequently contain some protein and fat. The only foods that are virtually 100 percent fat are oils, butter, and margarine.

Since our principal concern here is blood sugar control, we'll concentrate on how the three major types of nutrients affect blood sugar. If you're a long-standing diabetic and have followed the standard ADA diet for years, you'll find that much of what you're about to read is radically at odds with the ADA's dietary guidelines—and with good reason, as you'll soon learn.
When we eat, the digestive process breaks down the three major food groups into their building blocks. These building blocks are then absorbed into the bloodstream and reassembled into the various products our bodies need in order to function.

Protein

Proteins are chains of building blocks called amino acids. Through digestion, dietary proteins are broken down by enzymes in the digestive tract into their amino acid components. These amino acids can then be reassembled not only into muscle, nerve fiber, and vital organs, but also into hormones, enzymes, and neurochemicals.

We acquire dietary protein from many sources, but the foods that are richest in it are egg whites, cheese, and meat (including fish and fowl). Protein is available in much lower amounts from

vegetable sources such as legumes (beans), seeds, and nuts, which also contain the other nutrients, fat and carbohydrate.*

As stunning as it sounds—and unbelievable, given the popular media's recent love affair with a high "complex" carbohydrate, low-fat diet—you can quite easily survive on a diet in which you would eat no carbohydrate. Furthermore, by sticking to a diet that contains no carbohydrate, but high levels of fat and protein, you can reduce your cardiac risk profile—serum cholesterol, blood lipids, et cetera—though you'd deprive yourself of all the "fun foods" that we crave most. We've all been trained to think that carbohydrates are our best, most benign source of food, so how can this be?

Protein is the second of our two dietary sources of blood sugar. Protein foods are only about 20 percent protein by weight (6 grams per ounce), the rest being fat, water, or undigestible "gristle." The liver, instructed by the hormone glucagon, can very slowly transform as much as 52 percent of the above 6 grams per ounce into glucose† if blood sugar descends too low or the body's other amino acid needs have been met. Neither carbohydrate nor fat can be transformed into protein. In the 1920s, Arctic explorer Vilhjalmur Stefansson noted in his travels that Eskimos seemed to fare quite nicely on a zero-carbohydrate diet (the Arctic being not exactly the ideal climate for cultivating fruits, grain, or vegetables). Under the watchful eyes of physicians from New York's Cornell University Medical College and Bellevue Hospital, Stefansson and a colleague submitted themselves to a meat-only diet for a year. They ate 2,500 calories a day, of which 75 percent was fat. As reported in the Journal of the American Medical Association, on July 6, 1929, the two men finished out their year of a no-carbohydrate diet not only slimmer—each had lost 6 pounds—but with reduced (and completely normal) cholesterol. It's worth repeating that the men were eating a diet with 75 percent of the calories coming from fat. Current recommendations are to eat no more than 30 percent of calories as fat—which very few people can maintain—and there are some recommendations for even lower percentages than that.

This is almost precisely the opposite of the prevailing "wisdom," which says that if you want to lose weight and get your cholesterol down, you need to eat lots of fruit, vegetables, and grain products, and cut out meat as much as possible. Despite this prevailing "wisdom," many contemporary dietary researchers exploring this phenomenon have begun to arrive at the conclusion that a high-carbohydrate diet is not so benign. In fact, it has been shown—and it is my own observation—that such a diet can increase body weight, increase blood insulin levels, and raise most cardiac risk factors. Why?

The answer is really quite simple. The advent of our agricultural society is comparatively recent in evolutionary terms—that is, it began only about 10,000 years ago. For the millions of years that preceded the constant availability of grain and vegetable products, our ancestors were hunter-gatherers, and ate what was available to them in the immediate environment, primarily meat, fish, nuts—food that was present year-round, and predominantly protein and fat. In the summers they may have eaten fruits and berries that were available locally in some regions, but if they stored away fat during those seasons, that fat was quickly burned up during the winter. Although for the past two centuries, fruit, grain, and vegetables have, in one form or another, been available to us in this country year-round, our collective food supply has historically been interrupted often by famine—in some cultures more than others. The history of the planet as best

as we can determine is one of feast and famine, and suggests that famine will strike again and again. The recent famines in Ethiopia and Somalia are examples.

Curiously, the genetic predisposition toward obesity, or what today seems in our society to be a predisposition toward obesity, functioned during the famines of prehistory as an effective method of survival. Ironically, the ancestors of those who today are most at risk for Type II diabetes were, during prehistory, not the sick and dying, but the survivors. If famine struck today in the United States, guess who would survive most easily? The same people who are most at risk for Type II diabetes.

You can take this knowledge and make it work for you rather than against you.
If you give it some thought, it makes perfect sense: If a farmer wants to fatten up his pigs or cows, he doesn't feed them meat or butter and eggs, he feeds them grain. If you want to fatten yourself up, just start loading up on bread, pasta, potatoes, cake, and cookies—all high-carbohydrate foods. If you are already obese, you know and I know that you crave—and consume—these foods and probably avoid fats.

In many respects—and going against the grain of a number of the medical establishment's accepted notions about diabetics and protein—protein will become the most important part of your diet if you are going to control blood sugars.

If you are a long-standing diabetic and are frustrated with the care you've received over the years, you have probably been conditioned to think that protein is more of a poison than sugar and is the cause of kidney disease. I was conditioned the same way—many years ago, as I mentioned, I had laboratory evidence of advanced proteinuria, signifying potentially fatal kidney disease—but in this case, the conventional wisdom is just a myth.

Nondiabetics who eat a lot of protein don't get diabetic kidney disease. Diabetics with normalized blood sugars don't get diabetic kidney disease. High levels of dietary protein do not cause kidney disease in diabetics or anyone else. There is no higher incidence of kidney disease in the cattle-growing states of the United States, where many people eat steak every day, than there is in the states where beef is more expensive and consumed to a much lesser degree.

Similarly, the incidence of kidney disease in vegetarians is the same as the incidence of kidney disease in nonvegetarians. It is the high blood sugar levels that are unique to diabetes, and to a much lesser degree the high levels of insulin required to cover them (causing hypertension), that cause the complications associated with diabetes.

Fat

Call it the Big Fat Lie. Fat has, through no real fault of its own, become the great demon of the American dietary scene. It is no myth that one-third of Americans are overweight. It is, however, a myth that Americans are overweight due to excessive fat consumption.

The body acquires fat in two ways. The primary source of body fat for most Americans is not dietary fat but carbohydrate, which is converted to blood sugar and then, with the aid of insulin, to fat by fat cells. Remember, insulin is our main fat-building hormone. Eat a plate of pasta.

Your blood sugar will rise and your insulin level (if you have Type II diabetes or are not diabetic) will also rise in order to cover the jump in blood sugar. All the blood sugar that is not burned as energy or stored as glycogen is turned into fat. So you could, in theory, acquire more body fat from eating a high-carbohydrate "fat-free" dessert than you would from eating a tender steak nicely marbled with fat.

The other manner in which your body acquires fat is by eating it. Fat by itself doesn't taste particularly good. Pour yourself a tall, frosty mug of cooking oil and you'll likely gag trying to get it down. Take that same oil and french-fry potatoes in it, or drizzle some olive oil on your salad with vinegar, and suddenly it's delicious. The effect dietary fat has is to enhance flavor. When you eat food that contains fat (triglycerides), your digestive system breaks it down into fatty acids. These your body can burn or store, or convert into other compounds, depending on what it requires. Consequently, fat is always in flux in the body, being stored, appearing in the blood, and being converted to energy. The amount of triglycerides in your bloodstream at any given time will be determined by your heredity, your level of exercise, your blood sugar levels, your diet, your ratio of lean body mass (muscle) to visceral (abdominal) fat, and especially by your recent consumption of carbohydrate. The slim and fit tend to be very sensitive (i.e., responsive) to insulin and have low serum levels not only of triglycerides but insulin as well. But even their triglyceride levels will increase after a high-carbohydrate meal, as excess blood sugar is converted to fat. The higher the ratio of lean body mass to abdominal fat, the more sensitive to insulin you'll tend to be. In the obese, triglycerides tend to be present at high levels in the bloodstream all the time. (This is sometimes exaggerated during weight loss because fat is appearing in the bloodstream as it comes out of storage to be converted into energy.) Not only are high triglyceride levels a direct cause of insulin resistance, but they also contribute to fatty deposits on the walls of your blood vessels (atherosclerosis), which are a frequent factor in heart disease, strokes, and amputations not caused by injury. Research demonstrates that if you injected high concentrations of triglycerides into the blood supply of the liver of a well-conditioned athlete, someone very sensitive to insulin, she would become insulin-resistant until the excess triglyceride had been cleared from the bloodstream. (The most important thing to note here is that insulin resistance, as well as other risk factors for the diabetic complications I just mentioned, can be reversed by eating less carbohydrate, normalizing blood sugars, and slimming down, which we'll discuss in greater detail later on.)

If you become overweight, you'll produce more insulin, become insulin-resistant (which will require you to produce yet more insulin), and become yet more overweight because you'll create more fat and store more fat. You'll enter the vicious circle depicted in Figure 1-1.
Consider that steak I mentioned earlier. As you know, the body can convert protein to blood sugar, but it does so at a very slow rate, and inefficiently. Serum insulin levels derived from the phase II insulin response or even from insulin injected before a meal are thus sufficient to prevent a blood sugar rise from protein consumption. Fat cannot be converted to blood sugar, and therefore doesn't cause serum insulin levels or requirements for injected insulin to increase. Say you eat an 8-ounce steak with no carbohydrate side dish—this won't require much insulin to keep your blood sugar steady, and the lower insulin level will cause only a small amount of the fat to be stored.

Now consider what would happen if you ate the caloric equivalent of that steak as a "fat-free" dessert. Your insulin level has to jump dramatically in order to cover the carbohydrate in the dessert. Remember, insulin is the fat-building and fat-storage hormone. Since it's dessert, you probably won't be going out to run a marathon after eating, so the largest portion of your blood sugar won't get burned. Instead much of it will be turned into fat and stored.

Interestingly enough, eating fat with carbohydrate can actually slow the digestion of carbohydrate, so the jump in your insulin level might thereby be slowed down. This would probably be relatively effective if you're talking about eating salad with vinegar-and-oil dressing. But if you're eating a regular dessert, or a baked potato with your steak, the slowdown in digestion would not prevent blood sugar elevation in a diabetic.

Much of the reason Arctic explorer Stefansson and his colleague came out of their year-long meat-only diet thinner and with lowered cholesterol levels was that their blood sugar wasn't getting kicked up by carbohydrate—since they ate none.

Despite what the popular media would have us believe, fat is not evil. In fact, many researchers are becoming quite concerned about the dangerous potential of "fat substitutes." Fat is absolutely necessary for survival. Much of the brain is constructed from fatty acids. Without essential fatty acids—which, like essential amino acids, cannot be manufactured by the body and must be eaten—you would die. Fat substitutes such as the recently FDA-approved Olestra bring about the spectre of people trying to subsist on a no-fat diet, a diet that could kill them. (Olestra actually robs the body of important vitamins and fats, and the FDA has required that it contain additives of those vitamins. In test markets, some consumers have been made quite ill by the product, while others don't see any effect. I don't recommend it—it's completely unnecessary.)

Diabetics are affected disproportionately by diseases such as atherosclerosis. This has led to the long-standing myth that diabetics have abnormal lipid profiles because they eat more fat than nondiabetics.* It was likewise thought that dietary fat caused all the long-term complications of diabetes. For many years, this was taken as gospel by most in the medical community. In truth, however, the high lipid profiles in many diabetics with uncontrolled blood sugar have nothing to do with the fat they consume. Most diabetics consume very little fat—they've been conditioned to fear it. High lipid profiles are a symptom not of excess dietary fat, but of high blood sugars. Indeed, even in most nondiabetics, the consumption of fat has little if anything to do with their lipid profiles.

On the other hand, high consumption of carbohydrate, as we will discuss shortly, can cause nondiabetics to develop some of the complications usually associated with diabetes.
When I was on a very low fat, high-carbohydrate diet thirty years ago, I had high triglycerides (usually over 250 mg/dl) and high serum cholesterol (usually over 300 mg/dl), and I developed a number of vascular complications. When I went onto a very low carbohydrate diet and did not restrict my fat, the same thing happened to me that happened to Arctic explorer Stefansson, but more so—my lipids plummeted. Now, at sixty-three, I have the lipid profile of an Olympic athlete, apparently from eating a low-carbohydrate diet in order to normalize my blood sugars. That I exercise regularly probably doesn't hurt my lipid profile, either—but I was also exercising when my lipid profile was abnormal.

Dare your physician. Ask him or her if his lipid profile on a low-fat diet can remotely compare to mine, on a high-fat, low-carbohydrate diet:

- LDL—the "bad" cholesterol—83 (below 130 is considered normal)
- HDL—the "good" cholesterol—110 (above 30 is considered normal)
- Triglycerides— 45 (below 150 is considered normal)
- Lipoprotein(a)—undetectable (below 60 is considered normal)

Contrary to popular myth, fat is not a demon. It's the body's way of storing energy. Without essential fatty acids, your body would cease to function.

Carbohydrate

I've saved carbohydrate for last because it's the food group that affects blood sugar most profoundly—both by eating it and by not eating it. If you're like most diabetics—or even most Americans—you probably eat a diet that's mostly carbohydrate. Breakfast cereal. Grains. Fruit. Bread. Cake. Beans. Snack foods. Rice. Potatoes. Pasta.

No doubt you've heard the endless talk in the popular media about carbohydrate. Books tout the value of a high "complex carbohydrate" diet. Athletes "carbo-load" before big games or marathons. TV and radio commercials extol the virtues of Brand X sport drink over Brand Y because it contains more "carbos."

What if I, a physician, told you, a diabetic, to eat a diet that consisted of 60 percent sugar, 20 percent protein, and 20 percent fat? More than likely, you'd think I was insane. I'd think I was insane, and I would never make this suggestion to a diabetic (nor, in reality, would I even make it to a nondiabetic). But this is just the diet to which I was subjected for many years. The ADA made this recommendation to diabetics for decades. On the surface, these recommendations seemed to make sense because of kidney disease, heart disease, and our elevated lipid profiles. But this is what is known as single-avenue thinking. It seemed logical to insist that dietary intake of protein and fat be reduced because no one had looked at elevated blood sugars and the high levels of insulin necessary to bring them down as the possible culprits.

So if you eat very little fat and protein, what's left to eat? Carbohydrate.

As I discovered in my years of experimentation on myself, and then in my medical training and practice, the real dietary problem for diabetics is fast-acting or large amounts of carbohydrate, which result in high blood sugars requiring large amounts of insulin to try to contain them.
So what are carbohydrates?

The technical answer is that carbohydrates are chains of sugar molecules. The carbohydrates we eat are mostly chains of glucose molecules. The shorter the chain, the sweeter the taste. Some chains are longer and more complicated (hence, simple and complex carbohydrates), having many links and even branches. But simple or complex, carbohydrates are composed entirely of sugar.

Sugar? you might ask, holding up a slice of coarse-ground, seven-grain bread. This is sugar? In a word, yes, at least after you digest it.

With some important exceptions, carbohydrates, or foods derived primarily from plant sources, such as vegetables, grains, and fruits, have the same effect on blood glucose levels that table sugar does. (The ADA has recently recognized officially that, for example, bread is as fast-acting a carbohydrate as table sugar. But instead of issuing a recommendation against eating bread, its response has been to say that table sugar is therefore okay, and can be "exchanged" for other carbohydrates. To me, this is nonsense.) Whether you eat a piece of the nuttiest whole-grain bread, drink a Coke, or have a dollop of mashed potatoes, the effect on blood glucose levels is the same—blood sugar rises, fast.

How can this be?

As noted in the introduction to this chapter, the digestion process breaks each of the major food groups down into its basic elements, and these elements are then utilized by the body as needed. The basic elements of most carbohydrates are glucose molecules. We usually think of simple carbohydrates as sugars and complex carbohydrates as fruits and grains and vegetables. In reality, most fruit and grain products, and some vegetables, are what I prefer to talk about as "fast-acting" carbohydrates. Our saliva and digestive tract contain enzymes that can rapidly chop the longer chains down into the shorter, sweeter chains. We haven't the enzymes to break down some carbohydrates, such as cellulose, or "undigestible fiber." Still, even our saliva can break down starches into the shorter chains on contact.

Pasta, which is often made from durum wheat flour and water (but can also be made from plain white flour and egg yolks, or other variants), has been touted as a dream food—particularly for runners carbo-loading before marathons—but it quickly becomes glucose, and can raise blood sugar very rapidly.

In the Type II diabetic with impaired phase I insulin response, it takes hours for the pancreas to catch up with the levels of sugar in the blood, and day after day, during that time, the high blood sugars can wreak havoc. In the diabetic who injects insulin, there is a tremendous amount of guesswork involved in finding the proper dosage of insulin and timing it to cover a carbohydrate-heavy meal, and the injected insulin doesn't work fast enough (see Chapter 7, "The Laws of Small Numbers").

Some carbohydrate foods, like fruit, consist of high levels of simple, fast-acting carbohydrates. Maltose and fructose—malt sugar and fruit sugar—are slower-acting than sucrose—table or cane sugar—but they will cause the same increase in blood sugar levels. It may be the difference between nearly instant elevation and elevation in 2 hours, but the elevation is still high, and still requires a lot of insulin to bring it into line. Despite the old admonition that an apple a day keeps the doctor away, I haven't had fruit in more than twenty-five years, and I am considerably healthier for it. Some foods, like broccoli, contain lots of cellulose, or undigestible fiber, which slows the digestion and dilutes the small amount of digestible carbohydrate they contain.
As noted previously, most Americans who are obese are overweight not because of dietary fat, but because of excessive dietary carbohydrate. Much of this obesity is due to "pigging out" on

carbohydrate-rich snack food or junk foods, or even supposed healthy foods like bread and pasta. It's my belief that this pigging out has little to do with hunger and nothing at all to do with being a pig.

I'm convinced that people who crave carbohydrate have inherited this problem. To some extent, we all have a natural craving for carbohydrate—it makes us feel good. The more people gorge on carbohydrates, the more people will become obese, even if they exercise a lot. But certain people have a natural, overwhelming desire for carbohydrate that doesn't correlate to hunger. These people in all likelihood have a genetic predisposition toward carbohydrate craving, as well as a genetic predisposition toward insulin resistance and diabetes. This craving can be reduced for some by embarking upon a low-carbohydrate diet.

Some Words About Alcohol

Alcohol can provide calories, or energy, without directly raising blood sugar, but if you're an insulin-dependent diabetic, you need to be cautious about drinking. Ethyl alcohol, which is the active ingredient in hard liquor, beer, and wine, has no direct effect on blood sugar. In the case of distilled spirits and very dry wine, the alcohol generally isn't accompanied by high enough amounts of carbohydrate to affect your blood sugar very much. For example, 100 proof gin has 83 calories per ounce. These extra calories can indirectly increase your weight slightly, but not your blood sugar. Different beers—ales, stouts, and lagers—can have varying amounts of carbohydrate, which is slow enough in its action that if you figure it into your meal plan, it won't raise your blood sugar too much. Mixed drinks and dessert wines can be loaded with sugar, so they're best avoided. Exceptions would be mixed drinks that can be made with a sugar-free mixer, such as sugar-free tonic water.

However, ethyl alcohol can indirectly lower blood sugar of a Type I diabetic if consumed at the time of a meal. It does this by paralyzing the liver and thereby inhibiting gluconeogenesis so that it can't convert the protein of the meal into glucose. For the average adult, this appears to be a significant effect with doses greater than 1.5 ounces, or one standard shot glass. If you have two 1.5-ounce servings of gin with a meal, your liver may be partially unable to convert protein into glucose. If you're insulin-dependent, and your calculation of how much insulin you'll require to cover your meal is based on, say, two hot dogs, and those hot dogs don't get 10 percent converted to glucose, the insulin you've injected will take your blood sugar too low. You'll have hypoglycemia, or low blood sugar.

The problem of hypoglycemia itself is a relatively simple matter to correct—you just eat some glucose and your blood sugar will rise. But this gets you into the kind of messy jerking up and down of your blood sugar that can cause problems. It's best if you can avoid hypo- and hyperglycemia (high blood sugar) entirely.

Another problem with alcohol and hypoglycemia is that if you consume much alcohol, you'll have symptoms that could indicate either alcohol intoxication or hypoglycemia— light-headedness, confusion, and slurring of speech. The only way you'll know the cause of your symptoms is if you've been monitoring your blood sugar throughout your meal. This is unlikely. So you could find yourself with dangerously low blood sugar and just think you've consumed too

much alcohol. Remember, that early blood sugar–measuring device I got was developed in order to help emergency room staffs tell the difference between unconscious alcoholics and unconscious diabetics. Don't make yourself an unconscious diabetic. A simple oversight could turn fatal.

Many of the symptoms of alcohol intoxication mimic those of ketoacidosis, or the extreme high blood sugar and ketone buildup in the body that can result in diabetic coma. The buildup of ketones causes the diabetic to have a sweet aroma, rather like someone who's been drinking. If you don't die of severe hypoglycemia, then you might easily die of embarrassment when you come to and your friends are aghast and terrified that the emergency squad had to be called to bring you around.

In small amounts, alcohol is relatively benign—one glass of dry wine or a light beer with dinner—but if you're the type who can't limit drinking, it's best to avoid it entirely. For the reasons already discussed, alcohol can be more benign between meals than it is at meals.

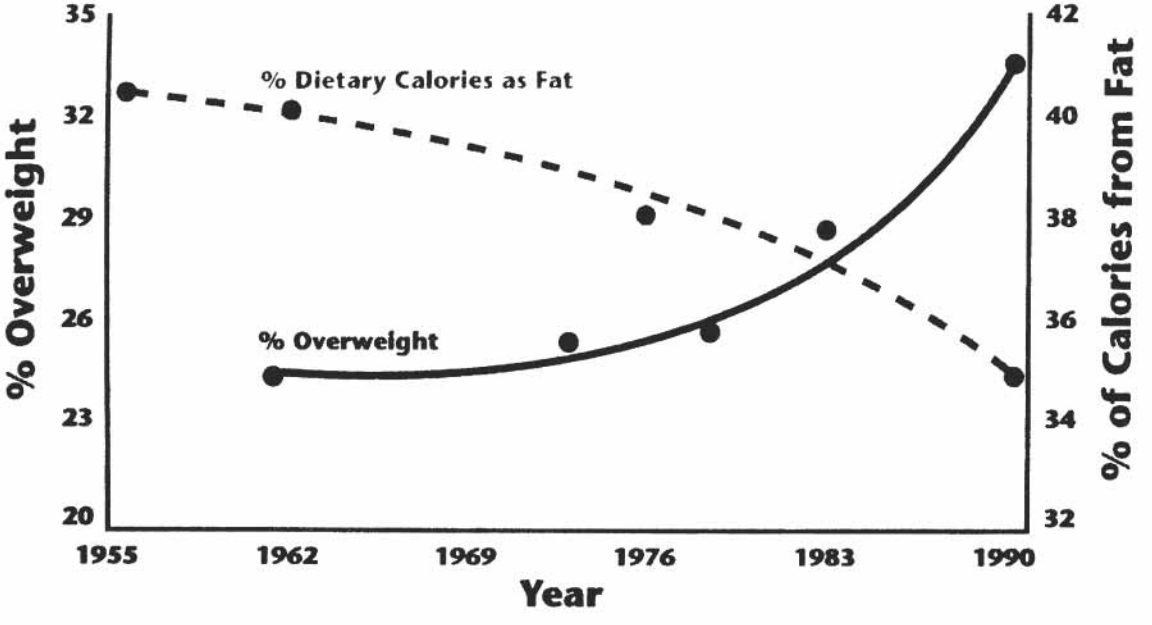

Fig. 9-1. *From 1955 to 1990, even as the percentage of calories consumed as fat declined, the percentage of overweight Americans increased by nearly half.*