THE THIN MAN'S DIABETES

AMERICA'S FASTEST-GROWING DISEASE HAS A SUGAR-COATED SECRET: YOU DON'T NEED TO BE OVERWEIGHT FOR IT TO KILL YOU

By Jeff O'Connell

SLIM CHANCE
THE AUTHOR HITTING A HE-MAN POSE IN GRADE SCHOOL. THE FIRST SIGNS OF DIABETES RISK CAN KICK IN AS EARLY AS THE TEEN YEARS.

One of my most enduring childhood images is from a newspaper clipping. The grainy photograph freezes a lanky teen named Tom O'Connell launching a hook shot from his right thigh. Tucker, as he was known, led a team from tiny Merchantville High School in scoring and rebounding during an improbable run to the South Jersey Championship. New Jersey had its own version of *Hoosiers* in 1952, and for that one season, my father was his team's Jimmy Chitwood.

In February 2008, I arrive at a nursing home in the San Fernando Valley to visit the man in that photograph, a man I've neither seen nor spoken to in 20 years. Entering his room, I barely recognize the gaunt face. Where his right thigh should be sits a corduroy pant leg, gathered up and bobby-pinned. The spindly arm he extends to greet me is splotched with blood bursts. Once 6'3" and 215 pounds, he's now a cadaverous-looking 145. The only cheerful note in the room is a balloon tied to the metal bed frame. His 73rd birthday was last week, apparently. It's a detail I had long since forgotten.

Like a man looking into a foggy mirror, my father strains to recognize me. But if he is staring into his past, I might be peering into my future. I'm 6'6" and weigh 220, with 12 percent body fat and the outline of abs above a 32-inch waist. Yet diabetes has me in its crosshairs as well.

If you think being thin gives you a free pass from this deadly disease, well, it may have a surprise in store for you, too.

COME, SWEET DEATH

The white curtain flanking my father's bed divides him from a man who speaks only Spanish and another who rambles incoherently all day in English. Yet Thomas Joseph O'Connell Jr. has an epidemic's worth of company. According to the Centers for Disease Control and Prevention, one in every four people in the United States is living with either type-2 diabetes (20 million) or its precursor, prediabetes (54 million). And the incidence of type 2—the kind of diabetes that people develop over time—has, in the past quarter-century, grown 32 percent faster among American men than among American women.

What's worse, type-2 diabetes is showing up in the young in record numbers. "People used to suffer type-2 diabetes in their 60s and heart disease in their 70s," says James O. Hill, Ph.D., the director of the center for human nutrition at the University of Colorado's health sciences center. "But with teens now developing it, are they going to have heart disease at 25 and need a transplant in their 30s? We've never gone through this before, but based on what we know about what happens once you have type-2 diabetes, the answer is probably yes."

Woe unto them, because raging blood sugar can lead to a litany of ailments biblical in scope: cardiovascular disease, liver disease, kidney failure (my dad needs dialysis three times a week), stroke, amputations, erectile dysfunction, blindness, and nerve damage—everything, seemingly, but a swarm of locusts. Even cancer has a sweet tooth, recent research suggests.

The total amount of glucose in a typical man's bloodstream is just shy of the amount in a teaspoon of sugar. A man crossing over into diabetes has about ¼ teaspoon more. That seemingly trivial amount can make a huge difference as blood glucose (a.k.a. sugar) plays seesaw with your hormones all day. The game begins whenever you eat carbohydrates—be it the sugar in a soda or the starch in bread and pasta. Your body breaks down these carbs so they can be absorbed into your bloodstream as glucose. The seesaw goes up: elevated blood sugar.

Glucose is important stuff—the cells in your muscles and brain use it for energy. But too much of it coursing through your blood vessels, for too long, is ultimately deadly. "It's kind of like dynamite," says Mary Vernon, M.D., president of the American Society of Bariatric Physicians. "The body realizes it's dangerous, not to be left lying around." That's why people with diabetes are frequent bathroom visitors.

To adjust to a surge of incoming carbs, your pancreas secretes the hormone insulin, which helps glucose enter your cells, where it belongs. (See "How Your Blood Sugar Works" on the next page.) This glucose leaving your bloodstream is the downstroke of the seesaw. Problems arise when some of your cells begin to deny access to insulin, and by extension, glucose—a condition called insulin resistance. This situation often goes unnoticed for years, but over time it worsens until the result is chronically high blood sugar and full-blown diabetes.

Here's how it all plays out: Your body tries to clear your bloodstream of excess glucose by signaling your pancreas to squirt out higher and higher amounts of insulin. Eventually, this flood of insulin drives blood sugar sharply lower, which makes you feel hungry and even shaky. So you reach for the quick fix—more carbs—and they send your blood sugar skyrocketing again, triggering the release of still more insulin and perpetuating the cycle. Instead of gently rocking, the seesaw slams down and bounces back up, over and over, for days, years, and decades. "The constant demand on your pancreas ultimately causes it to burn out, so that it no longer releases insulin," says Dr. Vernon. "That's when blood sugar stays elevated for good."

Of course, this insulin system has worked fine for 99.6 percent of human existence. That's because hunter-gatherers derived no more than 40 percent of their calories from carbohydrates, mostly fruit, according to Colorado State University scientists. What your pancreas wasn't designed to handle on a regular basis was the carb load from a Cinnabon washed down with a Big Gulp, all part of the 140 pounds of sugar the average American consumes annually. "The high-blood-glucose response to a high-carb diet is an almost normal response to an abnormal situation," says Ron Raab, past vice president of the International Diabetes Federation. "We've largely created this illness."

AN OMINOUS PREFIX

No single event fractured my relationship with my father. Lacking even the sense of purpose or legitimacy that a blowout argument or fight might have provided, the dissolution of our bond came after my parents divorced in the mid-1980s. Tom O'Connell had essentially been cast out of my mind for two decades until one of my two brothers told me that he was lying in intensive care in a Los Angeles hospital. He had diabetes and had barely survived two amputations on a leg, above the knee and then farther up. At the time, it didn't cross my mind to make the trip from eastern Pennsylvania to Southern California to say farewell.

I wouldn't be let off that easily, though. A week later I visited my own doctor, who had called me in to review blood work done several weeks earlier for a routine physical. He scanned my numbers and looked up. "Does diabetes run in your family?"

Bad medical news didn't shock me. Both of my parents survived cancer, and my mother has epilepsy. But I write for *Men's Health*. I've cowritten a book on sports nutrition. I've been the occasional butt of skinny-guy wisecracks in school. Diabetes? Isn't that for grandmothers in wheelchairs?

The doctor slid the lab report in front

DARK HORSE TOM O'CONNELL (SHOWN HERE IN JUNIOR HIGH) JOINED HIS HIGH SCHOOL TEAM AS A SENIOR—AND MADE THEM SOUTH JERSEY CHAMPS.

Photographs courtesy of Jeff O'Connell

YOUR PANCREAS WASN'T MEANT TO HANDLE THE CARB LOAD FROM A CINNABON AND A BIG GULP ON A REGULAR BASIS.

WILL YOU BECOME DIABETIC?

Take our self-test and find out

The American Diabetes Association singles out the fasting glucose test as the preferred way to diagnose type-2 diabetes, citing cost and ease. While useful, this blood-sugar snapshot doesn't reveal the excessive swings that indicate insulin resistance *before* your fasting level is elevated to diabetes or prediabetes.

For that, you need to take an oral glucose-tolerance test (OGTT), especially if you have a parent or sibling with type-2 diabetes. Being African American, Latino, Native American, or Asian American also elevates your risk. The symptoms of insulin resistance tend to come in clusters, so if you have one indicator, you're likely to have two or three others. However, under the "definitely" category (below), having just a single factor is cause for concern. In this case, contact your physician and schedule a time for an OGTT.

You might need an OGTT if . . .

1. You often wake up with a headache
2. You often wake up in the middle of the night
3. You had acne, numerous cavities, and hair loss in your teens/early 20s
4. You feel cranky or forgetful after a high-carb breakfast

You probably need an OGTT if . . .

1. Your blood pressure is 140/90 mm/Hg or higher
2. Your HDL (good) cholesterol is less than 35 mg/dl (milligrams per deciliter) and/or your triglycerides are higher than 250 mg/dl
3. You're thirsty or you urinate a lot
4. You tire easily and/or nap frequently, especially 1 to 2 hours after a meal
5. You're overweight (BMI 25 to 29.9)
6. You're 45 years old or older

You definitely need an OGTT if . . .

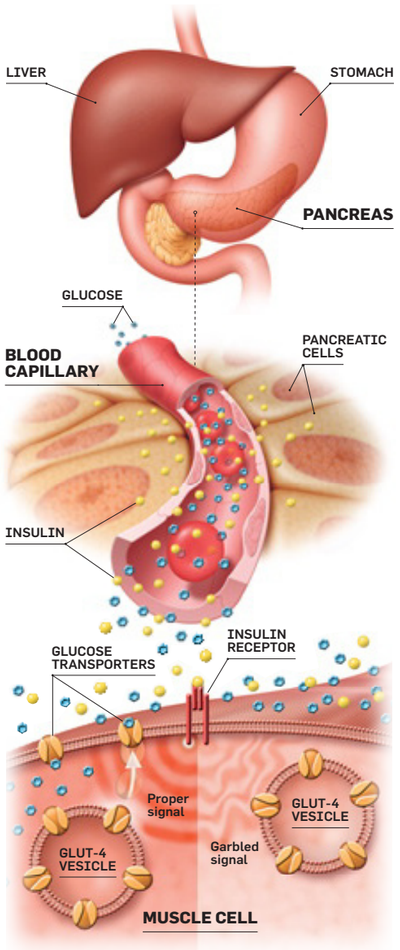
1. Your fasting plasma glucose (FPG) is 100 mg/dl or higher
2. Your hemoglobin A1C is greater than 6 percent
3. Any random blood glucose reading is 140 mg/dl or higher
4. You have any history of cardiovascular disease
5. You're obese (BMI = 30 or higher)

of me and began explaining the jumble of numbers. One stood out: 116, which quantified the amount of glucose floating in my bloodstream after a 12-hour fast. Under 100 milligrams per deciliter (mg/dl) is good; anything above 126 is diabetes. That meant I was well into prediabetes, a term sugar-coated in more ways than one, since most men eventually lose the prefix.

How the hell did I miss this? I thought. For months, my body had felt like a sputtering car in need of a tuneup. There were the severe headaches I had endured my entire adult life and the naps that left me so groggy it was like emerging from anesthesia. Then I replayed a scene from earlier that year. After months of nearly continuous stress, I woke up one morning feeling like a man who had been lost in a desert for days. I drank a glass of water, and another, and another, all weekend. Gallons, it seemed. Nothing could quench my thirst, a classic symptom of high blood sugar, since you're expelling so much fluid through your urine.

HOW YOUR BLOOD SUGAR WORKS

Your body has a finely tuned system for controlling blood sugar. One of the key players is insulin, a powerful hormone that's essential for helping move sugar from your blood into your cells. Here's how the process works—and how it can go wrong.



1 THE BASICS
When you eat food that contains carbohydrates, most is absorbed as glucose into your bloodstream.

As your blood-glucose level increases, your pancreas reacts by secreting the hormone insulin. Insulin then travels to the capillaries that deliver blood and nutrients to your muscles and brain.

Once it's in the capillaries, insulin is attracted to the insulin receptors that reside on the outer membrane of your muscle and brain cells. Insulin then binds to these receptors, like an electrical cord being plugged into an outlet.

2 A HEALTHY RESPONSE
In a person with normal blood-sugar responses, the connection of insulin to its receptor sends a signal to a pool (or vesicle) of glucose transporters inside the cell called GLUT-4 proteins.

When the signal is received, these GLUT-4 proteins move out of their vesicle toward the surface of the cell, where they help glucose move across the cell membrane.

This causes blood glucose to decrease and provides your muscle cell with sugar for fuel.

3 WHEN THE SYSTEM GOES BAD
In a person with insulin resistance, the insulin receptor sends out a garbled signal. This leads to what's tantamount to a dropped cellphone call. Some or all of the GLUT-4 proteins never receive the message to move to the surface of the cell.

As a result, glucose has no way in. The fewer GLUT-4 proteins on the surface of the cell, the higher your blood sugar remains.

Ultimately, much of this excess blood sugar is diverted to the liver, where it's converted to fat and can lead to increased insulin resistance—and higher blood sugar.

Within minutes of learning the reason for that episode, I would confront another harsh reality: Many physicians really don't have a clue about preventing type-2 diabetes in someone thin like me. My doctor mumbled something about switching from white rice to brown rice and told me to come back in 6 months, even though insulin resistance is a complex metabolic disorder requiring sophisticated, continuous management. What's more, the typical advice offered makes you wonder if Americans are being given an antidote against or a prescription for the disease. For example, everyone from my doctor to the American Diabetes Association (ADA) tells people with impaired blood sugar, or prediabetes, to make carbohydrate-rich foods such as breads and grains the foundation of their diets. This despite a growing body of evidence that points to carb reduction as the best anti-diabetes strategy. After all, there's another term for people who are insulin resistant: glucose intolerant. Meaning they don't respond well to carbohydrates. The higher the dose of carbs, the more problems those carbs cause.

This year, after decades of resistance, the ADA finally acknowledged low-carb dieting as a legitimate response to diabetes. Which goes to show that if you wait for a health organization to issue a position paper before attacking the disease, you may end up reading that paper from a hospital bed.

This isn't the failing of a single physician or organization. It's the breakdown of the U.S. medical system when it comes to nutrition. "Our medical establishment is set up to treat disease," says Susan M. Kleiner, Ph.D., R.D., a nutritionist in Mercer Island, Washington. "First-year med students rank nutrition among their top priorities. Yet by graduation, nutrition doesn't even make the list, because it's largely ignored." In fact, there are still medical schools that don't offer a single nutrition course.

SLASH AND BURN

Perhaps I was scared by news of my father's fate or angry that the disease had cut him down. Maybe I was emboldened by the knowledge that type-2 diabetes comes with instructions for defeating it, even if most doctors don't know them. Whatever the motivation, I was determined to haul off and floor this condition with one ferocious counterpunch. At least initially, I adopted a very-low-carbohydrate approach—specifically the Atkins diet—based on multiple Duke University studies that show it's

Medical illustration by JOHN KARAPELOU

ON GUARD TOM O'CONNELL'S (SHOWN WITH AUTHOR) SERVICE CONSISTED OF BARNSTORMING EUROPE ON A BASKETBALL TEAM OF ARMY ALL-STARS.

effective for both lowering blood sugar and reducing heart-disease risk. It seemed logical: The initial limit of 20 grams of carbohydrates a day would offer my pancreas a reprieve after a lifetime of sugar trauma.

Of course, I didn't know what 20 grams of carbohydrates would mean until I found myself in a supermarket pushing a shopping cart containing nothing but a can of shaving cream, laundry detergent, and a magazine. Everything in sight contained too much sugar for someone on the verge of diabetes, and some of the bachelor-friendly foods I'd relied on most were among the highest in carbs: frozen dinners and pizzas, cereal, cookies and other desserts, and snack foods. Bread, pasta, rice, and potatoes were gone from my list, too.

What remained was what some hunter-gatherers might have recognized as food had they been foraging on the periphery of a supermarket: fresh fruits and vegetables, nuts, eggs, and meat. The biggest adjustment came when I realized all the things I couldn't drink anymore—regular soda, beer, and fruit juices included. What's more, I'd even have to limit milk, since an 8-ounce glass contains 13 grams of sugar. A typical meal became steak, fish, or chicken accompanied by steamed vegetables and a glass of red wine, a low-carb godsend.

In addition to following my new diet strategy, I planned to torch any excess sugar by working out briefly but intensively 6 days a week: superset-based weight-lifting sessions one day, cardio intervals the next.

Just how powerful an antidote is exercise? A study published recently in the *American Journal of Physiology—Endocrinology and Metabolism* revealed that insulin resistance in rats decreased more from exercise than from taking metformin, the leading diabetes drug.

Exercise and dieting take effort and discipline, though. And it can be tempting to just take drugs to lower blood sugar and be done with it. After all, the major diabetes organizations have already raised the white flag of surrender and adopted that approach. "Two years ago, the ADA and the European Association for the Study of Diabetes decided that you really ought to just start people on medicine," says endocrinologist Larry C. Deeb, M.D., a past president for medicine and science at the ADA. "Very few people participate in dietary changes and physical activity, so you end up with patients not taking care of their diabetes. My take is, let me give you a prescription. No rule says I can't take you off the medicine later."

Yeah, except diabetes drugs are about as easy to ditch as crack—most people end up using more, not less. It's a vicious circle: The insulin-resistant patient is shepherded onto a high-carbohydrate diet per ADA guidelines, so his blood sugar stays elevated. As a result, his pancreas secretes more insu-

DIABETES DRUGS ARE ABOUT AS EASY TO DITCH AS CRACK—MOST PEOPLE END UP USING MORE MEDICATION, NOT LESS.

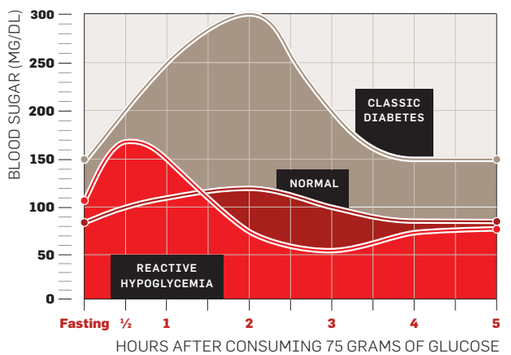
DANGEROUS CURVES

Blood-sugar responses to carbs are nearly as individualized as fingerprints, but they do fall within categories. The hours spent with muscle-starving low blood sugar (reactive hypoglycemia) shows how a man can be thin and fit yet still at high risk of type-2 diabetes.

CLASSIC TYPE-2 DIABETES
Fasting blood sugar above 126 mg/dl and a 2-hour oral glucose-tolerance test (OGTT) number above 200 both spell diabetes. (The chart at right shows the typical blood-glucose response to an OGTT.) Insulin injections would likely be prescribed in an attempt to drive down these numbers.

NORMAL BLOOD SUGAR
"Normal blood sugar would be a slow rise and a reasonable drop over several hours," says Keith W. Berkowitz, M.D. "But 'normal' is actually becoming less and less typical, given what's in our diets."

REACTIVE HYPOGLYCEMIA
The telltale signs of this condition are (1) blood sugar that drops more than 30 mg/dl within an hour; (2) a half-hour, 1-hour, or 2-hour reading lower than the starting (i.e., fasting) number; and (3) an A1C score lower than it should be based on fasting blood sugar.



8 WAYS TO CONTROL YOUR BLOOD SUGAR

To prevent diabetes, start here

1 **Exercise like it's a prescription.** That means at least 20 to 30 minutes every day. It takes a only a few days of missed workouts and poor eating to worsen a person's insulin resistance, says Barry Braun, Ph.D., an associate professor of kinesiology at the University of Massachusetts at Amherst. To make sure you stick with it, choose the exercise that you enjoy the most.

2 **Sprinkle cinnamon on everything you can stand.** Studies show it can improve insulin sensitivity. This means your body needs less of the hormone insulin to keep your blood-sugar levels in check. "The cheap supermarket stuff works just as well as expensive supplement versions," says Jonny Bowden, Ph.D., C.N.S., author of *The Most Effective Natural Cures on Earth.*

3 **If you already have high blood glucose, take alpha lipoic acid.** "This supplement is unexcelled as a blood-sugar nutrient and is a prescription item in Europe," says Bowden. He recommends taking 300 milligrams twice a day. Puritan's Pride Alpha Lipoic Acid is reasonably priced and passed purity tests at consumerlab.com.

4 **Skip the sugary sports drinks.** University of Massachusetts scientists recently discovered that exercising improved insulin sensitivity by 40 percent when a 500-calorie deficit was created, but produced no improvement when the burned energy was immediately replaced with mostly carbohydrates.

5 **Invest in a glucose monitor.** It'll allow you to find out how specific meals, foods, and beverages affect your blood sugar. One option is the TrueTrack Smart System brand ($13 for the monitor, $35 for the strips, cvs.com). Simply prick your finger 2 hours after a meal. The number shouldn't be above 139 mg/dl, and it shouldn't be below 100 or your fasting number—whichever is lower," says Keith W. Berkowitz, M.D. If you fall out of that range, you need an oral glucose-tolerance test.

6 **Snack on pumpkin seeds or sunflower seeds.** A small handful won't impact blood sugar, and they're rich in magnesium, a mineral that fights insulin resistance, according to a 2006 study from Tufts University researchers.

7 **Eat every 2 to 3 hours.** Eating this often helps prevent drops in blood sugar, which can lead to sugar binges, says Dr. Berkowitz.

8 **Check your meds.** If you're taking a thiazide diuretic for hypertension, ask your doctor about switching to an ACE inhibitor. A 2006 *Hypertension* review of 59 drug trials found a "strong relationship" between low potassium levels caused by diuretics and increased blood glucose.

lin—but with less and less effect. So he's given tablets to make his pancreas produce even more insulin. When that's not enough, he must inject the insulin. In contrast, when you exercise daily with few carbohydrates available for fuel, your body needs less insulin.

By my next doctor's appointment, my fasting blood sugar has fallen from 116 to 102 and my triglycerides from a high 289 to a better-than-average 89. (In the insulin resistant, these blood fats tend to rise with blood sugar.) Most impressive is my score on the hemoglobin A1C test, a 3-month running average of blood-sugar levels. The nondiabetic range is 4 percent to 6 percent. After months of exercising and carb slashing, my results fall squarely in the middle: 5 percent. In a word, perfect.

As I turn to leave, the doctor smiles and pats me on the back. "You're proof that diabetes can be addressed with diet and exercise," he says. "Most people don't do that. You're to be commended."

FROM HIGH TO LOW

"Actually, this is really bad."

The voice on the other end of the line belongs to Keith W. Berkowitz, M.D. He's the medical director of the Center for Balanced Health in New York City, which specializes in treating patients with serious blood-sugar irregularities. I had faxed the results to his office for a second opinion.

Dr. Berkowitz noticed a mathematical anomaly. While my A1C test was normal, my fasting-glucose score—taken when my blood sugar should have been at its lowest—was still too high. "For those two numbers to exist side by side means your blood sugar has to be in the 60s much of the time," he says. "Your biggest problem is hypoglycemia—low blood sugar." (Hypoglycemia is defined as less than 70 mg/dl; normal blood sugar, between 70 and 100 mg/dl.) If Dr. Berkowitz was correct, my blood sugar was on a roller-coaster ride, with the perfect A1C averaging two extremes.

Dr. Berkowitz asked me to visit his office in midtown Manhattan, where I would take a stress test for my metabolic system. If fasting glucose is one still image and an A1C is a composite image, the oral glucose-tolerance test (OGTT) is like watching a movie, and it's more revealing as a result. In a study published in the journal *Angiology*, all three tests were given to 144 patients—none of whom had been previously diagnosed with type-2 diabetes or impaired blood sugar. Yet 94 patients yielded OGTT results that revealed one of those conditions. The fasting-glucose test had missed 62 percent of those cases, and the A1C had missed 83 percent. "The last thing to go up is your fasting glucose," says Dr. Vernon. "The horse is already out of the barn at that point." That means the first signpost doctors are looking for is the last of the indicators to present itself.

My test begins with a lovely brunette in a white lab coat handing me a glass of a syrupy orange drink. It contains roughly the amount of sugar you would ingest from drinking two 12-ounce cans of Coke. Three hours into the test, even the pretty technician's gentle arm grab can't shake me from my stupor. But 20 minutes later, I suddenly become anxious, jittery. At 4 hours I start to feel more like myself again. Mercifully, the test ends.

"Sorry to have put you through all that torture," says a smiling Dr. Berkowitz a week later as he opens a manila folder containing my results. He was right—my condition is called reactive hypoglycemia, and it may be diabetes's most brilliant disguise of all. First my blood sugar shoots up to a prediabetic 165, a spike that by itself presents a significant risk factor for cardiovascular disease, according to a paper published in the *American Heart Journal*. Because my insulin does a poor job of ushering sugar into cells, my pancreas ends up producing 10 times more insulin than it should, according to Dr. Berkowitz. "That's like using an atomic bomb to take out a small village," he says, except it's my pancreas that will be destroyed over time. The nuke has driven my blood sugar into the 70s an hour later—but my insulin is still blasting away. It drives me down to 59 an hour after that—nap time. Five hours have passed and my blood sugar is still 20 points below where it started.

Granted, my hypoglycemia was induced by a stress test using 75 grams of glucose. But the standard recommendation for people with diabetes (using the American Academy of Family Physicians guidelines) means consuming up to 180 grams of carbohydrates over the course of a day. Split among three squares, as the organization's president, James King, M.D., suggests, that's just half an ounce less than an OGTT's worth of carbohydrates at each and every meal. (That's a huge load even with its absorption slowed by some fat and protein.) "We use the OGTT as a metabolic stress test, and yet the mainstream advice prescribes a diet that produces that amount of carbohydrates at every meal," says Raab. "It just highlights the misunderstanding of how carbohydrates impact diabetes."

Continued on page 168

No wonder guys are bonking at their desks all afternoon. Your brain produces no energy itself, yet it sucks up 25 percent of the glucose circulating throughout your body while you're up, and about 60 percent at rest. During hypoglycemia, gray matter is literally starving. (That explains my headaches.) You become shaky, anxious, dizzy, sweaty, tired, and unable to concentrate. Your body does whatever's necessary to protect your brain, and that includes breaking down muscle tissue so that it can be converted to glucose. Which begins to reveal why someone built like my father or me could be fast-tracking his way to type-2 diabetes. Because our insulin resistance results in frequent periods of low blood sugar, our bodies spend a good chunk of the day eating our own muscle.

As a result, we stay thin instead of gaining weight, as is often the case for people with insulin resistance and type-2 diabetes. In fact, insulin resistance is typically thought to cause weight gain, and vice versa. All of which makes the "thin man's diabetes" that much more perplexing. "The physiques of people at high risk of diabetes are becoming less stereotypical, making the disease harder to diagnose," says Dr. Berkowitz. His observations are supported by science: "If you look at distributions of large numbers of people, it's striking that not only do the overweight tend to be insulin resistant, but 10 percent to 15 percent of non-obese people are, as well," says Donald W. Bowden, Ph.D., director of the center for diabetes research at Wake Forest University school of medicine. Clearly, no one should assume he's immune to this disease.

SUGAR SHOCKED

I'm not the only one whose A1C score has led to serious head scratching of late. In February, the National Heart, Lung, and Blood Institute halted part of a large study because too many diabetic patients at high risk for heart attacks and strokes were actually dying of them while they were being treated aggressively—in some cases with multiple drugs and insulin injections—to lower their glucose. The goal was to bring them into line with normal, as measured by the A1C. Fifty years of conventional wisdom regarding diabetes says this group should have had the best outcome, not the worst.

It may be the wild ups and downs—replayed several times a day for years or decades—that takes the biggest toll on the body. Yet rather than seeing high and low blood sugar as two sides of the same insulin resistance, most of the diabetes organizations I contacted don't even think about the low side where type-2 diabetes is concerned.

> UP TO 15 PERCENT OF NON-OBESE PEOPLE ARE INSULIN RESISTANT, PUTTING THEM AT HIGH RISK OF DIABETES.

The CDC does acknowledge that reactive hypoglycemia exists, but it has no data for hypoglycemia among men in the United States with diabetes, according to a spokesman. But he goes on to say this: "No data provide sufficient evidence that reactive hypoglycemic leads to diabetes."

"I think reactive hypoglycemia is a big problem," says Dr. Berkowitz. "No, I take that back. It's a huge problem." He tells me what's at stake for me in this battle. "If you don't do what we've been talking about, you will, over time, become diabetic. There's absolutely no question about it." After seeing my father minus his entire right leg, I have no reason to doubt the good doctor.

Dr. Berkowitz says that for a glucose-intolerant person, when to eat is nearly as important as what to eat. It only makes sense: If you want that seesaw to move gently through a small range of motion instead of swooping, you need to tap it more than three times a day, right? So in addition to sticking with my reduced-carb diet, I need to eat *before* I become hungry and finish my third small meal of the day before most men sit down to lunch. Sure, it's inconvenient at times, but then, not as inconvenient as losing your limbs.

BREAKING THE CHAIN

My father was once a formidable man. He should have wiped out type-2 diabetes like one of the giants he knocked off in that basketball tournament. But how could he? Unless he lives long enough to read this article, he'll die not knowing the name of the metabolic disorder—reactive hypoglycemia—that made him diabetic. Coincidentally, my second and final visit with him coincides with his evening meal, wheeled into the room by two orderlies. I watch as they gently prick his finger to measure his blood sugar—and then leave behind a meal that includes mashed potatoes and fruit juice. I wonder if they've ever measured him an hour after such a carb-laden meal. Not that it matters now. The damage is done.

Near the end of my research, I'm stunned to learn that my grandfather, Thomas Joseph O'Connell Sr., another thin man, died from type-2 diabetes. One reason my father got blindsided was that his father had moved on, and one reason I didn't see diabetes coming was that my father and I had parted ways. Consider it one of the unexpected costs of fathers and sons disconnecting: missing what should be obvious signs of family illnesses. Ironically, this disease also reunited us in the end and provided us with our one final bond. As I leave, I realize this isn't just the first time I've seen my father in 20 years. This is probably our last goodbye as well.

THE NIGHT BEFORE MY LAST BLOOD DRAW for the lab work for this story, I begin my fast at 7 o'clock but still trudge off to the gym at 10 for a cardio blast. I also decide to rise at 6 the next morning; I want to hit the treadmill again for a few minutes of sugar burning before the nurse plunges a needle into my arm. For a year and a half, I've been determined to push that number under 100, no matter what it takes.

The alarm on my cellphone beeps. I roll over, gaze at the ceiling, and change my mind about the gym. What matters are the measurements I've already taken myself. In a year and a half, this disease has made me stronger, fitter, more determined, and more optimistic than I ever was before. In trying to lay claim to my body, diabetes unwittingly gave me a new lease on life instead.

When the lab results come back the following week, along with dramatic improvements in cholesterol and blood pressure, my fasting glucose registers 99. Those two digits say that my blood sugar is normal again. But I know better. Like millions of American men, my body can no longer handle processed carbs in anywhere near the quantities included in the typical American diet.

Type-2 diabetes still lies waiting for me. It just needs me to drop my guard and eat junk food, put sugar in my coffee, skip meals, fall out of shape, and forget for even a brief stretch that this metabolic fire needs only its oxygen to roar again.

That's all the breathing room this deadly disease needs to take me down—and maybe you, too. ■