

# Evolution $R_X$

# Evolution Rx

A PRACTICAL GUIDE TO  
HARNESSING OUR INNATE CAPACITY  
FOR HEALTH AND HEALING

William Meller, MD

A PERIGEE BOOK

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*For Amanda, whose enthusiasm lifted these explanations out  
of their origins in my practice and encouraged me to make a home  
for them in this book. If you were not part of my life,  
this book would never have been.*



# The Primal Diet

YOUR STONE AGE BODY'S WANTS AND NEEDS

Sunrise, 1 million years ago. A small family band of hunter-gatherers camps in a grove of trees surrounding a rocky outcrop. Nearby, a broad savanna spreads to the edge of the horizon. A dark-skinned woman, wrinkled from age, squats next to a fire. As the rosy fingers of dawn reach across the sky, a dozen others slowly awaken. Children rub their eyes, and elders gently stretch sore muscles.

Everyone feels the first pangs of hunger, but no food remains from the day before. The residue of woven grass baskets made each day to carry foodstuffs lies scattered about. A few youngsters gnaw on them, seeking any remaining drops of sweet juice or grease. It is late in the fall, and the pickings have been slim.

An infant's cry is quickly muffled in its mother's breast. Several women with toddlers in tow saunter off into the bush to dig for roots and tubers, foods that will carry them through the winter of this dry region. They find a patch of dried berries missed by the birds and ants. But most of the fruits of spring and summer are gone, and the



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precious pounds of fat they bestowed on these people are melting away.

As the women walk, they munch on an assortment of leaves, bark, and grass seeds that have not fallen to earth. Some turn over logs and stones, greedily grabbing beetles and grubs. They scan the trees for beehives, eager to find a treat to share with the group.

Around the campfire, the men and boys huddle to plan the day's hunt. They gesture and grunt in a simple language. Those who are fully grown—over age 13—heft sharpened sticks and stone-tipped spears and walk off into the vast sea of grass. Because they have camped in this spot for several weeks, they walk an hour before picking up signs of game. The hunters remain on the alert for wolves and large cats as they walk. Deer, rabbits, birds, and reptiles lead a risky existence here.

At midmorning the most experienced hunter urges the band off the track to explore a new area. The others readily follow. Travel comes naturally to them. They cover dozens of miles most days, proceeding cautiously and remaining watchful for signs of food or danger. At times they dash off in pursuit of a flushed bird or lope steadily to chase a wounded animal. When they are unlucky in their pursuit, they camp out and live off what they can scavenge. Sometimes they don't return to the band for days.

Life back at the campsite has advantages. By late afternoon, the gatherers straggle in. They drink their fill as they pass a pool gouged into the stream at the base of the bluff. For most, it's their first drink since morning because they have no way to carry or store water. They usually get moisture during the daytime by gnawing on leaves and roots.

As the sun sets, they collect around the small fire, still tended by the oldest woman. Most have already grazed on a wide variety of insects and leaves, but all must bring some of the day's spoils back to share with the group. Young boys bring lizards to roast. One lucky

woman laughs as she unveils a large fowl she flushed out and then felled with a rock. Other women offer tough but juicy tubers. On this day the women have outdone the men.

The hunters do not return. This is not unusual, but the others are anxious just the same. The hunters will most likely show up the next evening or the day after.

As the elders parcel out the bounty, family members grunt appreciatively at those who contributed the most. There is very little squabbling, except among the youngest. Everyone will sleep well-fed tonight.

## The Krispy Kreme Age

Our ancestors spent several million years gathering and chasing down every bite of food they ate. The reason we covet sweet, starchy, and greasy foods today is because they were important for survival but difficult to find. Combine them into a crunchy treat, and it's no wonder we can't eat just one potato chip.

Finding food has gone topsy-turvy since prehistoric times. We no longer spend hours in pursuit of every morsel. By simply reaching into the refrigerator, we can snag all the calories we need for the day in a few minutes. Of course we know that eating too much is bad for us, and we don't want to always be struggling with our weight or fighting off diabetes. And yet, however bad overeating is for us, we seem powerless to stop.

Since evolution has had so many millennia to shape our desires, why do we have such unhealthy appetites? What do we gain from craving french fries? Why don't we hunger for raw vegetables instead, if they're so good for us?

This eating binge is not just a lack of willpower. Every New

Year's Day we vow to change our ways. We put our money where our mouths are, spending \$63 billion a year on foods low in carbohydrates, fats, and sugars or high in vitamins, antioxidants, or omega-3 fatty acids—hoping they will help us lose weight. We dish out more than \$46 billion on diets, fitness programs, weight-loss drugs, and even surgery. Meanwhile, our healthcare system is burdened with hundreds of billions spent on obesity-related illnesses.

Gluttony may be a vice, but overeating is an epidemic. We can trace the origins of obesity to the conditions we evolved in, but it is fueled by wholly modern myths and conventional wisdom about food.

In the past 30 years, we've witnessed a tidal wave of obesity as nutritionists, doctors, and food manufacturers with the goal of slimming us down have promoted a fear of fats in the United States. But making food low in fat has never meant low in calories. In truth, it often means packing in more carbohydrates and more calories to make it appealing. A low-fat label gives us the false impression that we can eat as much of that "harmless" food as we want.

In our desperation to lose weight, many of us have tried diet after diet. But if there were a diet that really worked, we'd all know about it. We'd all be thin. The fact that so many diet books sell each year is all the evidence we need that none is really effective. Each helps a few people, but none works for very many.

This book is about the origin of this universal human dilemma as well as many of the major health problems that bedevil us today. They all share a common starting point: our adaptations to the conditions we faced in the Stone Age. Our problem with fat is no exception.

## What Did Our Ancestors Eat?

DNA and fossil evidence suggests that our earliest hominid, or nearly human, ancestors split off from their chimp-like relatives about 7 million years ago. They must have looked a lot like the apes and orangutans of today: hairy, small-brained tree dwellers that ate fruits and insects, which they could snatch easily in the trees, where they hung out for safety. They led a true hand-to-mouth existence.

Their fossilized skulls show broad, flat molars typically free of cavities. Because cavities result from bacteria that feed on sugars, they must have had very little sweet stuff in their diet. Scientists calculate that to get enough calories to support their size, these early human ancestors spent *up to 12 hours a day* gnawing and grinding, much as gorillas do today.

Early humans chewed their way through history for millions of years, gradually discerning the edible from the poisonous—just as other animals did. As they evolved a more upright posture and agile grasp to navigate the branches and reach for dangling delicacies, their diet expanded to include berries, grubs, fruits, eggs, and mushrooms—and the occasional small animal when they could catch it. They were omnivores, literally “everything eaters,” pretty much like chimpanzees today.

We know a lot about the Paleolithic, or Stone Age, diet because of painstaking research done by archaeologists who have sifted through delicate layers of debris swept from the floors of ancient cave dwellings and campsites. The identification of every shard of bone, pollen grain, and stone chip left behind reveals that the diet of early man has very little in com-

mon with what we eat now. Scientists estimate that our ancestors consumed up to *300 different foods* in a typical week. Today we average about 30.

Many of the roots and vegetables early humans thrived on were things your mom might have called *roughage*. Stone Age fruit bore little resemblance to today's plump, sweet, and juicy produce. An apple then looked and tasted more like today's hard crabapple. Berries were small, and early citrus fruits would make a bitter lime taste sweet in comparison. Despite this, as soon as fruits ripened, there was a mad dash by all manner of animals to feast on them before the brief season was over.

Along with honey and primitive grains, these bitter fruits were the main source of carbohydrates. Before the advent of agriculture, barely 11,000 years ago, most foods contained almost no edible carbohydrates, like starch or sugar. Our resourceful ancestors made do by eating a wide variety of plants and insects. The wild versions of wheat, corn, and rice grew sparsely, had thick husks, and produced few kernels containing little starch. Root crops were tough and took a lot of chewing. Nuts were tiny and bitter, more like acorns. And, as mentioned, even fruits were scrawny, fibrous, and none too sweet.

Because fruit and grains appeared for only a few weeks each year, it was vital for our ancestors to eat as much of them as possible before the birds or insects beat them to it. When fruit ripened, early humans gorged until they were stuffed—then ate again an hour or two later. As a result, our ancestors developed a never-ending craving for carbohydrates. The only limit was the size of their stomachs, which could stretch to accommodate the seasonal abundance.

During times of plenty, Stone Age people ate a whole lot more each day than they needed to survive. Those whose bodies were better at storing up those extra calories as fat bought some insurance for the lean times and passed on their genes for getting fat to the next generation.

This cycle of abundance and want lasted for millions of years. Very gradually, each succeeding generation learned a little: how to make sharper stone points, how to weave a basket, how to tan a hide, how to build a shelter. Every cultural innovation made life a little easier and more secure.

By accumulating skills and knowledge, our early ancestors slowly climbed the food chain. Archaeologists love to debate which came first: bigger brains or more protein in the diet. But we do know that as our ancestors became more clever, they became better hunters. Several hundred thousand years ago, the combination of sharper weapons and increased knowledge of the animal kingdom made our evolving forebears formidable masters of a high-protein lifestyle. Eating animals supplied more protein and fat with less effort than the laborious gathering of plants. Before farming changed everything, meat was the main course for hundreds of thousands of years.

Taming fire, roughly 1 million years ago, was a unique evolutionary event. Cooking breaks down starch and proteins, making them easier to chew and digest. Thus, more energy was available from every bite. In a very short time, the hours spent chewing dropped from 12 to 3 a day. This was the advent of leisure, time to sit around the fire and talk, all the better to pass along the knowledge gained in the day's activities.

By the late Stone Age, around 50,000 years ago, our own species, *Homo sapiens*, emerged as accomplished and resource-

ful hunters. Studies show they got around half their calories from meat and fat, almost 40 percent from roots and vegetables, and 10 percent from fruits and berries. These humans, with bodies and brains just like yours and mine, certainly knew as much about living in the natural world as the most skilled survivalists today. They ate very well. Life was no longer nasty, brutish, or particularly short.

It is from around this time that we find the first evidence of obese people. There weren't many of them, but as skills advanced and the size of tribes grew, a few individuals were able to lead pampered, sedentary lives supported by the rest. Sculpted images of enormously obese women, known as Venus figurines, are among the earliest works of art, carved more than 30,000 years ago. Of course we don't know the exact meaning these images held for their late Stone Age makers, but it is likely that, in the tradition of most art, they were expressions of beauty. Fat women have been cherished for their fertility in most cultures until very recently, and fertility is one of evolution's primary aims.

Only a few hundred thousand years after harnessing fire, early hominids set out on the first great migration around the globe. They were on a hunting trip. Humans love meat. In areas where game was abundant, some groups stayed in one place for tens of thousands of years. When meat became scarce, because of climate change or overharvesting, it was time to pick up stakes and search for happier hunting grounds. Research into the extinctions of large animals, such as the giant kangaroos and sloths of Australia and the bison and elk of Europe, shows that the spread of modern man occurred just when many species disappeared. This has continued into mod-

ern times, with the near demise of the buffalo in North America within the past 200 years and many fish species in current times.

Because meat was such a large part of the Stone Age diet and so abundant, our ancestors needed effective digestive signals to let them know when they had eaten enough fat or protein. Otherwise they would have eaten themselves into immobility. The stars of this show are the hormones of satiety, or fullness: leptin, ghrelin, orexin, cholecystokinin, neuropeptide Y, and agouti-related peptide. These internal chemicals act as switches to shut off our appetite when we have eaten enough. Too bad they work only when we eat fat and protein.

That's right. Our ability to metabolize starches and sugars evolved in the early lean times of our history, when fruits and berries were rare. *We have no hormonal shutoff switch to stop us.* Stone Age people needed to eat all they could and store the excess calories as fat. As a result, nowadays we can eat a whole box of cookies or bag of chips and not feel full until our stomach is stretched to bursting.

## Enter the Farmer

Agriculture brought about the greatest change in our diet by far, with consequences we are still struggling with today.

To the best of our knowledge, the first cultivated crop was probably the fig, grown in the Middle East around 11,000 years ago. Paleobotanists recently discovered dried figs from that time in Israel. We know this kind of fig was cultivated because,

like the modern fruit, it doesn't have viable seeds. Propagation requires that a cut branch be inserted directly into soil; the branch sends out roots to form a new tree.

It's easy to imagine a rainy day and a woman propping a branch laden with ripe figs in the soft earth near her shelter. Only a few weeks later, the branch would have sprouted; and soon after, the new tree would produce figs. Some prehistoric George Washington Carver realized that repeating this act would yield an orchard of fig trees with fruit for the plucking. Not long after growing figs, people experimented with other fruits and within less than a thousand years were planting and harvesting grains.

As agriculture spread around the world, people's appetites were no longer at the mercy of the hunt. Instead they lived by the whim of the weather. Early farmers quickly learned to stockpile crops for the lean years and to select the fattest, fastest-growing, and hardiest grains to plant the following season. This was the origin of genetic modification by artificial selection.

In the last 11,000 years, as the result of such selection by humans, all of our fruits and vegetables, and most of our livestock, have been bred to be larger, more tender, richer in calories, and sweeter or fatter than their naturally occurring progenitors. Today there is almost no food we eat, except meat and mushrooms, that would look familiar to a caveman.

The first farmers were shorter than their immediate Stone Age predecessors. In spite of the conventional image of Stone Age people as small, most cavemen were as tall as we are today. The average adult *Homo erectus* stood about 5 feet, 10 inches tall. As agriculture spread, more people could be fed—when

the weather cooperated. But when drought or locusts struck, people starved. Famine years resulted in the stunted growth of whole generations of children. In addition, the depletion of game animals near early settlements meant less meat, less protein, and less fat so necessary for optimum growth.

Something similar has happened in the past few decades as Americans have increased their consumption of overly refined grains, artificial fats, sugary soft drinks, and other junk foods. With the arrival of diets based on such empty calories, statistics show that Americans are not as tall, on average, as they were 20 years ago.

The invention of agriculture marks the end of the Stone Age. People settled near their fields to tend and defend them and soon began to work with metals, developing farm implements, jewelry, and weapons. Where fields produced abundantly, populations grew rapidly. Porridge and bread came to dominate the diet.

## Obesity in a World of Perpetual Plenty

These changes upset the ancient balance of our ancestral appetites. Sugars and starches are simple molecules, absorbed quickly in the first 2 feet of our small intestine. In contrast, proteins, fats, and fibrous vegetables assimilate more slowly, farther along the remaining 22 feet of the intestine. This helps explain why after eating a meal of mostly carbohydrates we are soon hungry again. Our digestive tract is empty and ready for more.

When we eat too many carbs, sugar builds up in our blood.

Our bodies convert the excess sugar into fat to store for the future. The result is obesity as well as, for many of us, the complications of diabetes, high blood pressure, heart disease, and arthritis from carrying around the extra weight.

Nowadays we live in a carbo-wonderland of rice, pasta, potatoes, and bread. Twinkies, french fries, and ice cream are a poor match for bodies that lack a natural brake on their intake. Little wonder that obesity and diabetes are now the greatest causes of illness and death in the Western world.

Our ancient ancestors got fat the same way we do today. They ate more than necessary. But for them it served a useful purpose.

The more efficiently a Stone Age person could store fat, the better he or she was able to survive the lean times. We descended from these evolutionary success stories, those who could store fat easily. As Roger H. Unger of the University of Texas Southwestern Medical Center puts it, “Obesity is nature’s way of surviving famine.”

Remaining overweight beyond a single season of plenty is unnatural. In the wild, most animals store up fat for the winter and are thin before spring.

We have farming to thank for today’s abundance of calories. And we have scarcity in times past to thank for our inability to control our appetites.

## Carbs and Proteins and Fats, Oh My!

Every morsel of food we eat is made up of proteins, fats, and/or carbohydrates. That’s the whole menu.

- *Proteins* are the main nutrient in meat, fish, and nuts. They are found in lesser amounts in grains. Protein makes up our muscles, ligaments, bones, and enzymes.
- *Fats* are probably the most misunderstood nutrient. Many hormones and vitamins as well as our brains, nerves, and the outer layer of every cell in our bodies are formed of fats. We store energy as fat. We use cholesterol, a fat, to make essential steroid hormones. We *need* them. Our ancestors evolved a taste for fatty foods when they were in short supply. People who liked them were better able to survive.
- *Carbohydrate* is the chemical name for sugars, starches, and fiber. A starch is simply many sugar molecules linked together in a chain. Fiber is similar but in a form we can't digest. Starch is how plants store extra energy, the veggie equivalent of fat in our bodies. As discussed earlier, starches and sugars were much less available in the Stone Age than they are today.

## Fat or Fit? An Evolutionary Choice

Evolution gave us obesity as a cushion against hard times, but in modern times, body fat is ruining our lives.

There is no field in which quackery, false claims, deceit, and plain old foolishness runs more rampant than that of dieting. How are we ever to sort out what really works from the food fad of the moment?

Let's be clear about one thing. *Obesity results from eating too much.* Regardless of medical condition, genetic trait, or the

## The Vegetarian Diet

Parents often ask me if I think a vegetarian diet is safe for their children. The fact that hundreds of millions of people in India have been eating a meatless diet for centuries suggests that it is safe. But it's not optimal.

One way to follow the evolution of the early mammalian diet is to look at the length of the intestines and the enzymes used in digestion in different animals. Meat eaters, like wolves and lions, have short intestines because digesting meat is easier than digesting roughage. Apes and cows have much longer ones. Humans fall right in between. Plus, humans have digestive enzymes that work only on animal fats and proteins. Muscles are meat, and meat is made of proteins. The more protein we eat, the easier it is to maintain our muscles. Muscle was as indispensable in the Stone Age as it is now.

Cavemen needed fats, too, as do we. Our brains are largely fat, and fatty sheaths coat our nerves. With a broad and carefully maintained diet, we can manufacture most of the fats we need without eating animal fat. But such diets require a lot more work.

There are several kinds of fats, though, called essential fatty acids (EFAs), that humans can't make and so must obtain from food. These are the currently renowned omega-3 and omega-6 fatty acids. These fats are found only in certain foods like seeds and nuts, which were available for only a few weeks a year in olden times. It is interesting that fish is one of the best sources. This suggests that humans have been eating fish for so long and so continuously that we lost the need to make EFAs and became dependent on getting them via our diet. This is known as the *aquatic ape hypothesis*.

Children in particular need EFAs and other fats to grow properly. Breast milk supplies plenty of them. After that it's up to the diet. Without adequate protein and fat in their diets, children grow more slowly, are shorter, have weaker bones, and build less

muscle. Research also shows that without these fats and adequate protein, children have delayed brain growth and lower IQs.

To me, the most significant caution provided by an evolutionary medical perspective is that we should be very careful about imposing our own diet biases on our growing children. Our offspring have needs that were established long ago and should be honored lest we deprive our kids of nutrients essential to their growth.

side effects of medication, to gain weight we have to eat more than we need. Birth control pills don't cause weight gain; overeating does. A thyroid condition can't make you gain weight; overeating can. Your family history is history. If you are overweight, it is because of *how much you eat*—not how much your family ate.

Adding it up is simple: 1 pound of fat on our bodies contains 3,500 calories of energy. So if we eat only 35 extra calories a day—1 teaspoon of peanut butter or two crackers—we will gain a pound every 3 months. That's 4 pounds a year, 40 in a decade. Sounds like middle age.

Fortunately, this formula works the same in reverse. Eating just a tiny amount less than we need every day can cause us to slowly lose weight. No need for crash diets.

We have already seen where our cravings come from. Now let's look at the two ways to help our bodies say "enough." The first is how to feel physically full. The second is to know how to turn on our internal signals that turn off our hunger.

When we eat so much we can't pack in any more food, we lose our appetite. But eating *bulky fibrous foods*—like leafy salads, vegetables, radishes, celery, and cabbage—fills us up before

we have eaten too many calories. These foods are digested slowly and make us feel full longer. This is similar to the chewy, high-fiber diet of the early Stone Age.

Another way to suppress appetite is to eat more *protein and fat*, stimulating the hormones that make us feel satisfied. Fat tastes good to us because it was essential to our ancestors. This is the key to the Atkins, South Beach, Zone, and other low-carb diets. Eating rich foods, or even a spoonful of vegetable oil in a glass of water, makes us feel full.

If you're trying to lose weight, concentrate on the *meat and vegetables*, leave the starchy bread and potatoes on the plate, and skip dessert. You'll feel full and start shedding pounds promptly. This isn't as hard as you might think: If you think about it, it's the spaghetti sauce and meatballs that taste good, not the pasta.

One method of dieting that is very popular and successful with my patients is the One Bite Less diet. However much you are used to eating, try eating one bite less. It doesn't take much willpower, and you don't have to eat any foods you dislike or avoid any of your favorites. You still take as much on your plate as always but eat one bite less of each portion. Each bite is around 30 calories, and we eat about 10 servings of different foods each day. One bite less adds up to about 300 easily avoided calories a day, or losing 1 pound every 2 weeks.

Exercise helps burn calories, and it certainly feels good. But it is not the secret to weight loss. In the Stone Age, people were active much of the day because they had to be. But our laziness, resting whenever we can, makes sense from an evolutionary point of view. Resting conserves energy, and energy (think food) was often in short supply. More than half the people I

see in my office seeking to lose weight assume their problem is a lack of exercise. But exercising hard for an hour burns only about 400 calories. That's two Krispy Kreme sugar doughnuts or half a Big Mac. Think about it. You probably know plenty of thin people who never exercise, but you'll never find a fat person who doesn't eat too much. *Eating less* is the key.

We have all heard a lot of strange ideas about the best time of day to eat. Some people swear by breakfast, while others assert that eating before bedtime turns calories directly into fat. Neither is true. A calorie in the morning equals a calorie at night. In the Stone Age, sometimes people ate all day as they gathered food. Sometimes they had to wait until the end of an exhausting hunt. Our bodies are adapted to use what we need when it is available and to turn any excess into you know what.

In general, we get hungry and have less willpower later in the day. Eating also makes us sleepy, because blood is diverted from our brains to our digestive tract to absorb nutrients. It's easy to get in the habit of snacking before bed. Bedtime habits are very strong. If this is you, try eating your last meal later in the day. You will go to bed more satisfied and sleep better, too.

Ancient peoples were hardwired to appreciate variety in their diet; so are we. But today we suffer the consequences of all too easy access. Who doesn't know the experience of feeling full after a large meal—until someone brings out a chocolate layer cake? Suddenly we can pack in a second meal's worth of calories.

Some diets curb our appetites by suppressing this variety trigger, limiting a day's fare to one food; the cabbage soup, grapefruit, and broth diets are examples. Call it the Boredom Diet, but it works—for a while.

## Lactose Tolerance

Lactose intolerance is one of the most commonly misdiagnosed conditions in patients with stomachaches. It rarely develops in adulthood and is the real cause of symptoms in fewer than 10 percent of white Americans.

The only time people drank milk for most of evolutionary history was while breast-feeding. After weaning, milk simply wasn't available.

When we are infants, we all have an enzyme in our stomachs to digest the milk sugar lactose. Because this enzyme, lactase, can fade away after weaning, roughly three-quarters of adults worldwide are lactose intolerant (which matters little because most Africans and Asians have no dairy on their menu). Without lactase, lactose passes through the small intestine undigested, causing bloating, cramps, and diarrhea when it gets to the colon.

It is interesting that even people who make very little lactase can tolerate small amounts of milk, typically up to 8 ounces, with few symptoms. If these individuals drink milk on a regular basis, the amount of lactase they produce will be maintained, making it possible for them to digest dairy products. The best treatment for lactose intolerance is to drink a small amount of milk regularly, not to avoid it.

In infants, a complete inability to digest lactose is extremely rare. There were no alternatives to breast milk in the Stone Age, so children with this condition wouldn't survive to pass on their genes. Some pediatricians—and all the companies that make milk substitutes—encourage mothers to stop breast-feeding when their baby becomes fussy or has diarrhea. This makes little sense because if you stop breast-feeding, your infant may lose the ability to digest milk and may become hooked on milk substitutes. The best solution is to simply feed your baby a smaller amount of breast milk.

Some fans of a Stone Age diet suggest we eat only foods that existed then. This is practically impossible without spending a lot of time hunting and gathering in your local park and may be frowned upon by the groundskeepers. We can be perfectly healthy living on meat, fish, vegetables, fruits, and nuts from the grocery store. Adding dairy products ensures enough calcium. A *small* amount of complex carbohydrates in the form of whole grains won't hurt most of us.

Food has always had two purposes—survival and reward. We eat our favorite foods when we want to feel good or need cheering up. We share special meals to celebrate the joy of being alive. Never skimp on these occasions. All the dieting you do should go out the window when you are at a great restaurant or celebrating with family at home.

There's no point in dieting on your birthday. It's all the other days that count.

## Diabetes: How Sweet It's Not

The disconnect between how we were designed to eat and what we eat now is revealed in my office on a daily basis. When we eat carbohydrates, whether processed or whole grains, they are absorbed as sugar into the bloodstream. When blood sugar rises, the pancreas releases insulin, instructing fat and muscle cells to soak up the excess.

Insulin has been called the hormone of plenty—plenty of trouble in some cases. When we eat a lot of carbs and make more insulin to clear it from the blood, our fat cells just get fatter. If we eat a lot of carbs but can't make enough insulin to

handle it, the excess sugar floats around in the bloodstream, with disastrous results.

In type 1 diabetes, the pancreas doesn't make insulin because the immune system prevents it (see Chapter 3). This is why people with type 1 diabetes need insulin shots.

Type 2 diabetes, the much more common kind, is quite different. People with this disease can still make lots of insulin, but not enough to keep up with the amount of carbohydrates they eat and the resulting increase in sugar in their blood. Sugar is sticky stuff. Think what happens when you bite down on a caramel. It sticks to your teeth. Similarly, excess sugar sticks to the linings of the tiny capillaries that supply blood to all our organs and tissues.

“Caramelized” blood vessels become stiff and break easily, causing lots of organ damage. This is how diabetes causes poor circulation, eye damage, kidney failure, and heart attacks.

To treat diabetes, doctors prescribe medicines that boost the amount of insulin released from the pancreas or make cells more responsive to insulin.

This can clear the excess sugar out of the blood, but it does so by pushing more sugar into fat cells, making the patient even fatter. Doctors are loath to admit it, but most diabetics treated with medication become even more obese, causing them to need even more medicine.

They become trapped in a spiral—more medicine causing more obesity requiring more medicine because we fail to remember where high blood sugar comes from. For many years, I didn't either. I just got very good at writing prescriptions.

But when I began studying the daily life of our Stone Age ancestors, what they ate and how they lived, it became obvious

## Flash Those Pearly Whites

Within their hairy jutting jaws, our Stone Age relatives had remarkably healthy teeth. It's not that their choppers were stronger than ours. They weren't. Cavemen just didn't have many cavities.

We know this because some paleoanthropologists devote their entire careers to studying ancient teeth. Our ancestors' tooth enamel was exactly the same as ours—the hardest, longest-lasting substance in the body. Ancient teeth made durable fossils.

These fossils reveal that Stone Age teeth had a rough time of it, undergoing wear and tear from being used as tools and from cutting, grinding, and chewing food many hours a day. Of course, cavemen didn't have toothbrushes, fluoridated water, or dental floss. So how did they avoid cavities?

The answer is diet. The bacteria that rot teeth feed only on sugars. Unlike proteins and fats, sugars are small and sticky. *Streptococcus mutans*, the main bacterial culprit in tooth decay, lives in the crevices of our teeth and turns sugar into an acid that erodes dental enamel. That leaves holes, or cavities, for more bacteria to live in.

We know from genetic studies that *S. mutans* has existed in close to its current form for several million years. It found a good niche, so why change? Because tooth enamel is still the same, the difference must be diet.

Back when fibrous roots and sour fruits made up nearly all the carbohydrates in a person's diet, bacteria in the mouth had little chance to produce acid. In contrast, our modern diet, sweetened with simple carbs and sugary sodas, is a bacterial paradise. It's no surprise that dental cavities are the most widespread chronic disease of childhood in the world today, five times as common as asthma.

that more pills and more injections are a prescription for disaster. I found myself explaining the evolutionary origins of type 2 diabetes to my patients and coaching them on the myriad guises that carbohydrates take in our modern diet.

Helping my patients change their diets to be more in line with what our bodies were designed to eat made it much easier for them to control their appetites, limit their cravings for sugars, lose weight, and return their blood sugars to normal—without medication.

Since the late 1990s, many of my patients have been able to arrest the symptoms of diabetes by dramatically decreasing the amount of carbohydrates in their diet. And those who make the changes early in the course of the disease are able to reverse much of the circulatory and nervous system damage. By making these changes, the body's hungry housekeeping squads are able to clear away excess sugar molecules lodged on blood vessel walls.

I recently counseled a 55-year-old man who had gained 30 pounds in 3 years and was struggling with increasing blood sugar. Not wanting to take pills, he jumped at the chance to control his early diabetes with diet alone. Just 3 months after modifying his diet to meet his body's ancient needs, he returned to the office 20 pounds lighter. And his blood sugar readings were normal.

I asked him if he was having problems with the diet. He reported loving bacon and eggs for breakfast, tuna and mayo salad for lunch, and steak and veggies for dinner. He was thrilled not to be taking any medicine.

Recent scientific studies confirm this approach. In Leicestershire, England, researchers found that switching to this type of diet and increasing exercise, which also helps burn up blood sugar, was at least as effective as taking prescription drugs. In

many individuals, symptoms begin to reverse even when they lose as little as 5 to 10 pounds.

Meanwhile, diabetes, along with its complications, remains the most expensive illness in the United States today. The total cost of diabetes care in 2007 was \$174 billion. Furthermore, 1 in 5 healthcare dollars is spent on people with diabetes, while 1 in 10 goes for direct diabetes care.

By some estimates, global rates of type 2 diabetes will double by 2030. We can stop this, but not by prescribing more pills and more shots. Instead we must follow our bodies' evolutionary needs for health.

## Evolution $R_x$ for a Healthy Diet

- Aim to get at least 50 percent of your calories from meat and fish, 40 percent from vegetables, and less than 10 percent from fruits and grains.
- Forget about a low-fat diet. Go low-carb instead. Avoid bread, cereal, pasta, potatoes, rice, beans, and other grains. None was on the menu in the Stone Age.
- Maintain a healthy weight and avoid obesity, diabetes, heart disease, high blood pressure, arthritis, and stroke by restricting the number of calories you're ingesting to what you burn.
- Be an omnivore. Eating a wide variety of foods ensures you get all the vitamins and minerals you need—without taking vitamin pills or supplements.
- In the absence of gnawing on bones like a caveman, include dairy products and root vegetables for calcium.
- If you are a vegetarian for ethical reasons, be very careful

to avoid nutritional deficiencies. Try not to foist your dietary beliefs on your growing children.

- Throw all rules out the window on your birthday and other special occasions. Eat whatever you want and enjoy.

## Evolution $R_x$ for Weight Loss

- Eat fewer calories.
- Count on fatty foods and proteins to satisfy your hunger better than starchy, sugary ones. Fats and proteins trigger satiety hormones and take more time and effort to digest.
- Fool your Stone Age appetite by filling up on bulky low-calorie veggies like celery, radishes, and salads. Also, drinking warm liquids can trick your body into feeling full for a while.
- Look to spicy rather than bland foods to make you feel more satisfied. Plus, spices contain many micronutrients—they're good for you.
- Watch out for fruit juice and sodas. They are mostly sugar and water with a little flavoring.
- Exercise because it's enjoyable and healthy, but don't count on it to shed weight.
- Eat meals whatever time of day *you* want to. A calorie is a calorie no matter when you eat it.