

How to Reverse Type 2 Diabetes, Why Insulin May Actually Accelerate Death, and Other Ignored Facts

By Dr. Mercola

Great Britain, like the United States, has seen a remarkably rapid rise in pre-diabetes and type 2 diabetes over the last decade. According to a recent BBC News¹ report, more than one-third of British adults are now pre-diabetic.

In 2003, 11.6 percent of Britons had pre-diabetes. By 2011, that figure had more than tripled, reaching 35.3 percent. Researchers warn that this will lead to a massive avalanche of type 2 diabetics in upcoming years, which will have serious consequences for health care and life expectancy.

In the United States, nearly 80 million people, or one in four has some form of [diabetes or pre-diabetes](#). What's worse, both type 1 and type 2 diabetes among children and teens has also skyrocketed.

The most recent data,^{2 3} reveals that, between 2001 and 2009, incidence of type 1 diabetes among children under the age of 19 rose by 21 percent. Incidence of type 2 diabetes among children aged 10-19 rose by 30 percent during that same timeframe!

Conventional Medicine Has It All Wrong...

Statistics such as these point to two very important facts. First, it tells us that diabetes cannot be primarily caused by genetics, and secondly, it literally screams that something we're doing, consistently and en masse, is horribly wrong, and we need to address it.

In this case, that "something" is a seriously flawed diet and lack of physical activity. Unfortunately, Dr. Ron Rosedale wrote in 2005, [doctors cause diabetics to D.I.E](#) from their flawed prescriptions, which stem from a basic lack of insight into the root cause of this disease. D.I.E., here, is a clever acronym for "Doctor Induced Exacerbation," which does indeed include early death.

Conventional medicine has type 2 diabetes pegged as a problem with blood sugar rather than the underlying problem of improper insulin and leptin signaling. The reality is that diabetes is a disease rooted in *insulin resistance*⁴ and perhaps more importantly, a malfunction of leptin signaling, caused by *chronically elevated insulin and leptin levels*.

This is why the medical community's approach to its treatment is not getting anywhere. Treating type 2 diabetes with insulin is actually one of the *worst* things you can do...

Recent research has come to the same conclusions that Dr. Rosedale warned us about nearly a decade ago, which is that treating type 2 diabetes with insulin can lead further to the development of type 1 diabetes.

And, not only are conventionally-trained doctors wrong about the cause of the disease, but they continue to pass along seriously flawed nutritional information as well, which allows the disease to increase to epidemic proportions.

Definitions of Terms

Before we get into the nitty-gritty of causes and treatments for diabetes, let's clarify the difference between type 1 and type 2, and the emergence of what some are now referring to as "type 3" diabetes. The terms "pre-diabetes" and "metabolic syndrome" also need to be explained.

- **Pre-diabetes, also known as impaired glucose tolerance**, is a term used to describe an earlier state of *progressing insulin resistance*. It is conventionally diagnosed by having a fasting blood sugar between 100 and 125 mg/dl. Pre-diabetes is very easy to turn around. Simply swapping processed foods for whole organic foods lower in sugar and sugar-forming carbohydrates combined with a few minutes of daily exercise will quickly put you on the road to reversing this condition.
- **Metabolic syndrome**. As your insulin resistance progresses, your liver makes too much sugar and fat, and your skeletal muscles are less able to burn them and make glycogen, which is how glucose is stored in your muscles and liver. In turn, there is an increase in sugar and fats in your bloodstream which leads to high triglyceride levels and increased body fat--especially abdominal fat, and higher blood pressure. Having 3 or more of a *group of symptoms* caused by insulin (and now we also know leptin) resistance -- high triglycerides, low HDL, higher blood glucose and blood pressure, and increased belly fat—is referred to as metabolic syndrome (in the past it was called Syndrome X).
- **Type 1: insulin-dependent diabetes**. Traditionally, type 1 diabetes develops before the age of 20. It used to be relatively uncommon, but as noted above, its incidence is rapidly rising. Type 1 diabetes is classically an autoimmune disease in which your immune system destroys the insulin-producing cells of your pancreas, resulting in an inability to produce any significant insulin which that, if left untreated, will cause death in days to weeks from a hyperglycemic coma.

This deficiency of insulin is why type 1 is called "insulin-dependent" diabetes. There is currently no known way to completely reverse this.

However recent research suggests glimmers of hope. For example, Columbia University scientists claim that by turning off a particular gene, human gut cells can be converted into cells that produce insulin in response to dietary sugar.^{5 6}

- **Type 2: non-insulin-dependent diabetes**. In type 2 diabetes, the pancreas is producing some insulin, in fact usually too much, but is unable to recognize the insulin and use it properly. This is an advanced stage of *insulin resistance*, which is typically caused by a diet that is too high in sugars and sugar forming foods.

When you have inadequate insulin signaling, sugar cannot get into your cells and instead builds up in your blood. While anyone can get type 2 diabetes, you are typically considered at highest risk if you are overweight, sedentary, if you are a woman who had gestational diabetes, have family members with type 2 diabetes, or have metabolic syndrome. However, all of these really have the same underlying root of insulin and leptin resistance.

Type 2 diabetes represents the vast majority of all diabetics, and contrary to conventional medical and media teaching, it's nearly 100 percent curable through lifestyle changes alone (if these are instituted before conventional medical therapy/drugs kills the cells in the pancreas that makes insulin, causing type 1 diabetes too; see below).

Study Confirms: 'Insulin Therapy May Do More Harm Than Good'

A study published in the June 30, 2014 issue of *JAMA Internal Medicine*⁸ concluded what Dr. Rosedale has been saying for two decades, that insulin therapy in type 2 diabetic patients may indeed do more harm than good. As reported by Medical News Today:⁹

"In the US, type 2 diabetes is diagnosed when hemoglobin A1c levels reach 6.5 percent or higher. The higher A1c levels are, the greater the risk of other health problems. Sometimes the condition can be managed through changes in diet, but other patients with type 2 diabetes may need medication - such as insulin or metformin - to help lower their blood sugar levels, and ultimately, reduce the risk of diabetes complications.

But the researchers of this latest study... claim that the benefits of such treatment - particularly for people over the age of 50 - may not always outweigh the negatives. 'In many cases, insulin treatment may not do anything to add to the person's quality life expectancy,' says study co-author John S. Yudkin... 'If people feel that insulin therapy reduces their quality of life by anything more than around 3-4 percent, this will outweigh any potential benefits gained by treatment in almost anyone with type 2 diabetes over around 50 years old.'

For example, they estimate that a person with type 2 diabetes who begins insulin therapy at age 45 and lowers their hemoglobin A1c levels by 1 percent may experience an extra 10 months of healthy life. But for a patient who starts treatment for type 2 diabetes at age 75, they estimate the therapy may only gain them an additional 3 weeks of healthy life. The researchers say this prompts the question - is 10-15 years of pills or injections with possible side effects worth it?"

New Kid on the Block: Type 3 Diabetes, or 'Brain Diabetes,' May Be Responsible for Alzheimer's Disease and Glaucoma

A growing body of research suggests there's a powerful connection between your diet and your risk of both Alzheimer's disease and glaucoma,¹⁰ via similar pathways that cause type 2 diabetes. Alzheimer's disease was tentatively dubbed "[type 3 diabetes](#)" in early 2005 when researchers learned that the pancreas is not the only

organ that produces insulin. Your brain also produces insulin, and this brain insulin is necessary for the survival of your brain cells.

A drop in insulin production in your brain may contribute to the degeneration of your brain cells, and studies have found that people with lower levels of insulin and insulin receptors in their brain often have Alzheimer's disease. Researchers have now discovered that insulin does far more than simply regulating blood sugar. Your brain does not require glucose, and actually functions better burning alternative fuels, especially ketones. In fact, Dr. Rosedale believes that it is the constant burning by the brain of glucose that is primarily to blame for Alzheimer's and other brain disorders

Insulin is actually a "master multitasker" that helps with neuron glucose-uptake, and the regulation of neurotransmitters, like acetylcholine, which are crucial for memory and learning. This is why reducing the level of insulin in your brain impairs your cognition. Other research¹¹ shows that type 2 diabetics lose more brain volume with age than expected—particularly gray matter. This kind of brain atrophy is yet another contributing factor for dementia. "Brain diabetes" may also be responsible for glaucoma, according to recent research. As reported by Medical News Today:¹² *"Researchers [in India]... have proposed a new mechanism of glaucoma which suggests that diabetes can occur in the brain and may be the cause of many neurodegenerative disorders including glaucoma... an irreversibly blinding disorder with almost 65 million sufferers worldwide. There is no cure..."*

The recent paper titled 'Glaucoma: Diabetes of the brain - a radical hypothesis about its nature and pathogenesis', published in Medical Hypotheses... explore glaucoma and related neurodegenerative diseases from many perspectives and come up with a multifaceted and internally coherent concept of glaucoma being 'the diabetes of the brain.'"

It's becoming increasingly clear that the same pathological process that leads to insulin resistance and type 2 diabetes may also hold true for your brain. As you over-indulge on sugar and grains, your brain becomes overwhelmed by the consistently high levels of glucose and insulin that blunts its insulin signaling, leading to impairments in your thinking and memory abilities, eventually causing permanent brain damage.

Additionally, when your liver is busy processing fructose (which your liver turns into fat), it severely hampers its ability to make [cholesterol](#), an essential building block of your brain that is crucial for optimal brain function. Indeed, mounting evidence supports the notion that significantly reducing fructose consumption is a very important step you can take to [prevent Alzheimer's disease](#).

Root Causes of Type 1 Diabetes

Contrary to type 2 diabetes, type 1 is not may not be rooted in insulin and leptin dysfunction caused by excessive sugar (and carbohydrate) consumption. However, over the past several years, research has given us important clues about its predisposing conditions. Two important ones that you have more or less complete control over are:

- **Vitamin D deficiency.** Research suggests that sun avoidance may play a major role in the development of insulin dependent diabetes. The further you move away from the equator the greater your risk of being born with, or developing type 1 diabetes. A major key to *preventing* type 1 diabetes in children is to ensure that pregnant mothers have optimal vitamin D stores. There is also strong evidence that this can decrease your child's risk of autism. Once your child is born, ensuring he or she gets optimal sun exposure (and/or wise use of oral vitamin D supplementation) could virtually eliminate the risk for type 1 diabetes.
- **Abnormal gut flora.** An excessive focus on a germ-free environment is another potential contributing factor that impairs immune function. In 2008, animal research¹³ suggested that beneficial bacteria could protect against the development of type 1 diabetes. There is a good deal of evidence that a contributor to the rising rates of type 1 diabetes is raising our children in too sterile an environment. Many parents religiously use antibacterial soaps and keep their children away from the natural dirt, germs, viruses and other grime of childhood.¹⁴ Antibiotics, which kill all of the good and bad bacteria in the gut, are also overused in childhood. The lesson here is, it's okay to let your child get dirty. Use plain soap and water for washing. Avoid antibiotics unless absolutely necessary, and feed them naturally fermented foods such as yogurt, pickles and sauerkraut.¹⁵

Root Causes of Insulin Resistance, Pre-Diabetes, Metabolic Syndrome, and Type 2 Diabetes

Type 2 diabetes involves loss of insulin and leptin sensitivity. This makes it easily preventable and nearly 100 percent reversible without drugs. One of the driving forces behind type 2 diabetes is excessive dietary **fructose**, which has adverse effects on all of metabolic hormones—including two key players: insulin and leptin. There is no question in my mind that regularly consuming more than 25 grams of fructose per day will dramatically increase your risk of insulin/leptin resistance, metabolic syndrome, and chronic diseases, including obesity, type 2 diabetes, cancer, heart disease, arthritis, and Alzheimer's. It's important to realize that even though fructose is relatively "low glycemic" on the front end, it actually reduces the receptor's affinity for insulin, leading to chronic insulin resistance and elevated blood sugar on the back end. So, while you may not notice a steep increase in blood sugar immediately following fructose consumption, it is likely changing your entire endocrine system's ability to function properly behind the scenes...

Another major cause of type 2 diabetes is the consumption of the vast amount of glucose derived from the high carbohydrate diet that has been recommended for the last half century by conventional medical and media recommendations. All carbohydrates that are not fiber will be quickly metabolized into sugar, and it makes little sense to eat large amounts of sugar to keep your blood sugar lower.

The misconception of the cause of diabetes may be the biggest problem. Conventional medicine describes diabetes as a disease characterized by elevated

blood sugar. This "dysregulation of blood sugar control" is typically explained as "an inability of your body to produce enough insulin." To control diabetes with that view, it would be rational to prescribe insulin or drugs that raise insulin to counteract the elevated blood sugar. The reality however is that type 2 diabetes is NOT the result of insufficient insulin production. It's actually the result of *too much* insulin being produced on a *chronic* basis primarily from eating the high carbohydrate, low fat diet recommended by the ADA and AHA to prevent and treat this.

This overwhelms and "deafens" your insulin receptors, hence the term "insulin resistance." It's the chronically elevated insulin levels that make your body "resistant" to understanding the signals sent by the insulin. This also occurs with leptin. It's really important to realize that T2 diabetes is not caused by elevated blood sugar or "insulin deficiency" per se. The root cause is insulin and leptin resistance which is why prescribing insulin is one of the WORST things you can do for type 2 diabetes, as it will actually worsen your insulin and leptin resistance over time. You do not need more insulin. You need to restore the sensitivity of your insulin and leptin receptors by keeping their levels low!

If you're still having trouble understanding why taking insulin is a terrible choice in type 2 diabetes consider this; when your blood sugar becomes elevated, insulin is released to direct the extra energy (sugar) into storage. A small amount is stored as a starch called glycogen, but the majority is stored as fat. Therefore, insulin's primary role is not to lower your blood sugar, but rather to store this extra energy as fat for future needs when food may not be available. The fact that insulin lowers your blood sugar is merely a "side effect" of this energy storage process. Taking more insulin just makes you fatter!

Your body's cells become desensitized to insulin, leptin, and other hormones, by being *overexposed* to these hormones—be it by eating food that causes excessive secretion, or by injection. Diabetes treatments that concentrate merely on lowering blood sugar by adding insulin therefore tend to *worsen* rather than remedy the actual problem of metabolic miscommunication.

As Dr. Rosedale has previously stated: *"Type 2 diabetes is brought on by constantly having too much insulin and leptin circulating secondary to the same diet that has been recommended to treat diabetes and heart disease, a high carbohydrate, low-fat diet. Then giving these diabetics more insulin is adding gasoline to the fire. Doctors couldn't be doing more harm if they tried."*

Leptin—An Oft-Ignored KEY Player in Type 2 Diabetes Development

While much conventional advice centers around insulin, *leptin* is another hormone that plays an integral role in the development of type 2 diabetes. Leptin is produced in your fat and other cells, and one of its primary roles is regulating your appetite and body weight. Leptin tells your brain when to eat, how much to eat, and most importantly, when to stop eating. Leptin also instructs your brain as to what to do with the available energy.

Now remember, when your blood sugar becomes elevated, *insulin* is released to direct the extra energy into storage—the majority of which is stored as *fat*, and *leptin* is produced in these fat cells. The more fat you have, the more leptin is

produced. Furthermore, as the sugar gets metabolized in your fat cells, the fat releases further surges in leptin. This is why I typically talk about insulin *and* leptin resistance, as they work in tandem. Moreover, *leptin is largely responsible for the accuracy of insulin signaling and whether or not you become insulin-resistant*. If you're insulin resistant, you're more than likely leptin resistant as well, especially if you're overweight or obese.

Why?

Because when you develop leptin resistance, your brain can no longer hear leptin's signals, resulting in chronic hunger, overeating, inability to properly burn fat and, typically, obesity. Insulin resistance, and ultimately type 2 diabetes, follow suit. Just as with insulin, the only known way to reestablish proper leptin signaling is through proper diet. High consumption of carbohydrates, especially fructose, are again the prime culprit and the root cause of leptin resistance. Lack of exercise and abnormal gut flora also contribute and/or exacerbate insulin and leptin resistance. Leptin's importance in blood glucose control and diabetes is powerfully illustrated by recent studies that show its ability, even in low doses, to lower blood glucose in both type 1 and 2 diabetics, and this is an exciting new potential treatment.

Magnesium Deficiency—Another Factor That Raises Your Risk for Insulin Resistance and Type 2 Diabetes

Magnesium deficiency is also worth mentioning while still on the subject of root causes of type 2 diabetes. Magnesium actually plays an important role in glucose and insulin homeostasis,¹⁶ and magnesium deficiency is widespread these days. Magnesium is also required to activate tyrosine kinase, an enzyme that functions as an "on" or "off" switch in many cellular functions and is required for the proper function of your insulin receptors.

It is well known that people with insulin resistance also experience increased excretion of magnesium in their urine, which further contributes to diminished magnesium levels. This magnesium loss appears to be secondary to increased urinary glucose, which increases urinary output.¹⁷ Therefore, inadequate magnesium intake seems to prompt a vicious cycle of low magnesium levels, insulin resistance, elevated insulin and glucose levels, and excess magnesium excretion. In other words, the less magnesium your body has, the less it appears to you'll be able to "hang onto it."¹⁸

Rarely do so many studies,¹⁹ ²⁰ ²¹ from around the world find universal agreement on a subject, but here the evidence is clear: if you want to optimize your metabolism and keep your risk for type 2 diabetes low, one of the things you need to do is consume adequate magnesium. One 2013 study involving pre-diabetics found that most had inadequate magnesium intake, and those with the highest magnesium intake reduced their risk for blood sugar and metabolic problems by a whopping 71 percent.²²

Current government guidelines for magnesium intake among adults call for 300 to 420 mg per day (depending on your gender, age, pregnancy and lactation), but many people consume less than 300 mg per day. Research suggests many would

benefit from a much higher intake, about 700 mg per day or more. Magnesium is lost in sweat during exercise and used up in higher amounts when you're stressed.

I believe that magnesium threonate is one of the best supplemental sources, as it seems to penetrate cell membranes, including your mitochondria, which results in higher energy levels. Additionally, it also penetrates your blood-brain barrier and seems to do wonders to treat and prevent dementia and improve memory. Whatever supplement you choose, be sure to avoid any containing [magnesium stearate](#), a common but potentially hazardous additive.

New Warning: Insulin Can Rapidly Produce Type 1 Diabetes in Type 2 Diabetics

Please understand that medications and supplements are *not* the answer for type 2 diabetes. Diabetes drugs fail to address the underlying problem, and many, like [Avandia](#), can have dangerous side effects. Avandia is linked to 43 percent increased risk of heart attack and 64 percent higher risk of cardiovascular death, compared with other treatments. Instead, type 2 diabetes is best controlled by *restoring your insulin and leptin sensitivities*. This is done by eliminating grains and sugars—especially fructose—from your diet, getting plenty of healthy fats, exercising, and sleeping well. Further details on this will be provided below, in the treatment section.

As noted earlier, recent research published in the *Journal of Clinical Endocrinology & Metabolism*²³ confirms what Dr. Ron Rosedale has stated for the last two decades, which is that insulin treatment can provoke otherwise reversible type 2 diabetes to progress into type 1 insulin deficient and therefore insulin-dependent diabetes. The study found that giving genetically engineered recombinant insulin to type 2 diabetics with certain genetic susceptibility can trigger their bodies to produce antibodies that destroy their insulin producing cells (pancreatic islet cells). You may not realize that all human insulin, the type typically used, is GMO or genetically modified which might be responsible for this autoimmune reaction.

Basically, it triggers an autoimmune disease response, producing a condition in which you have both type 1 and type 2 diabetes simultaneously. The average time of type 1 diabetes onset was 7.7 months. One study participant developed type 1 diabetes in just over one month! According to the authors, **acute deterioration of blood glucose control after administering insulin is a warning sign of this problematic side effect**. According to this study, the genes predisposing you to this autoimmune-type response to insulin are:

- Type 1 diabetes high risk HLA class II (IDDM1), thought to play a role in about half of all type 1 diabetes cases
- VNTR genotype (IDDM2), which is believed to predispose you to type 2 diabetes

This is yet another way conventional diabetic treatment pushes diabetics into premature death... Research²⁴ published last year revealed that treating type 2 diabetes with insulin more than *doubled* patients' risk of all-cause mortality. It also leads to:

Twice as many myocardial infarctions	1.4 time more strokes	2.1 time more neuropathy	1.4 times more cancer
1.7 time more major adverse cardiac events	3.5 times more renal complications	1.2 times more eye complications	2.2 times more deaths

Another study published in *Diabetologia*^{25, 26} in May of this year, found that diabetic cancer patients also have a significantly elevated risk of death. Diabetic patients using insulin at the time of their cancer diagnosis had a four times higher mortality rate one year after cancer diagnosis, compared to non-diabetic patients, or those who did not use insulin to control their diabetes. While this was an observational study, which means it cannot establish causality, it is worth noting nonetheless. Dr. Rosedale has also said; *"All of these increased rates of chronic diseases caused by taking insulin may be because it is doing exactly the opposite of what has been shown in many studies to reduce cancer, total mortality, and extend lifespan; reducing insulin. In fact, T2 diabetes is often considered to be a model of accelerated aging because of the high insulin. In other words, treating diabetics by overly raising insulin, either with drugs or insulin itself, is only further accelerating their aging, associated chronic diseases, and death, and should be considered malpractice."*

Warning #2: Beware of Future Diabetic Vaccines

As noted by GreenMedInfo.com,²⁷ these findings also raise serious warnings against diabetic vaccines:

"[T]here are a number of trials underway to produce vaccines containing insulin intended to induce a 'tolerogenic immune response' and therefore ameliorate autoimmune type 1 diabetes. Clearly, however, their findings run contrary to this expectation, revealing that it is possible that introducing exogenous forms of insulin may stimulate the opposite reaction and induced autoimmunity against the hormone, or the cells in the pancreas responsible for producing it."

It also raises questions about the safety and effectiveness of synthetic insulin. Virtually all of the insulin sold in the US is synthetic, synthesized from recombinant DNA technology, which differs considerably from natural animal-derived insulin. Interestingly, it could be that it's the "inactive" ingredients or additives, such as polysorbate 20, that produce an exaggerated immune response in susceptible individuals—similar to that encountered with vaccines. Sayer Ji also notes that:²⁸ *"Furthermore, synthetic insulin does not have the same conformational state – i.e. it does not assume the same complex folded form – of natural human insulin, or more closely related pig insulin. This presents a 'recognition' problem from the perspective of the immune system which may identify the foreign protein as 'other' generating acute or sustained autoimmune reactions to it as a result..."*

Research²⁹ dating back to the early 1980s compared synthetic E. Coli derived insulin with porcine (pig) derived insulin in diabetic children and found that porcine insulin was more effective at lowering HbA1 values (a marker of damage associated with elevated blood sugar), superior at reducing fasting glucose concentrations, and less

antibody reactive to insulin than synthetic insulin. While pig derived insulin has its limitations, especially considering there are limits to how much can be produced, clearly it is more appropriate than synthetic versions if it is true that the latter is incapable of reproducing the same therapeutic outcome for diabetics."

How to Prevent and Treat Insulin/Leptin Resistance and Type 2 Diabetes

Now that you have an understanding of the root causes of insulin resistance and type 2 diabetes, it's time to outline a program to reverse this condition. Remember, type 2 diabetes *is* curable, and in the vast majority of cases does *not* require any form of medication.

The following nutrition and lifestyle modifications should be the foundation of your diabetes prevention and treatment plan. Also, make sure to monitor your FASTING insulin level. This is every bit as important as monitoring your fasting blood sugar. You'll want your fasting insulin level to be between 2 and 4. The higher your level, the greater your insulin resistance and the more aggressive you need to be in your treatment plan, especially when it comes to altering your diet.

- **Swap out processed foods, all forms of sugar—particularly fructose—as well as all grains, for whole, fresh food.** A primary reason for the failure of conventional diabetes treatment over the last 50 years has to do with seriously flawed dietary recommendations. Fructose, grains, and other sugar forming starchy carbohydrates are largely responsible for your body's adverse insulin reactions, and all sugars and grains—even "healthful" grains such as whole, organic ones—need to be drastically reduced.

If you're insulin/leptin resistant, have diabetes, high blood pressure, heart disease, or are overweight, you'd be wise to limit your total fructose intake to 15 grams per day until your insulin/leptin resistance has resolved. This includes about 80 percent of Americans. For all others, I recommend limiting your daily fructose consumption to 25 grams or less, to maintain optimal health.

The easiest way to accomplish this is by swapping processed foods for whole, ideally organic foods. This means cooking from scratch with fresh ingredients. Processed foods are the main source of *all* the primary culprits, including high fructose corn syrup and other sugars, processed grains, **trans fats**, artificial sweeteners, and other synthetic additives that may aggravate metabolic dysfunction.

Besides fructose, trans fat (NOT saturated fat) increases your risk for diabetes³⁰ by interfering with your insulin receptors. Healthy saturated fats do not do this. Since you're cutting out a lot of energy (carbs) from your diet when you reduce sugars and grains, you need to replace them with something. The ideal replacement is a combination of:

- **Low-to-moderate amount of high-quality protein.** Substantial amounts of protein can be found in meat, fish, eggs, dairy products, legumes, and nuts. When selecting animal-based protein, be sure to opt for organically raised, grass-fed or pastured meats, eggs, and dairy, to avoid potential

health complications caused by genetically engineered animal feed and pesticides.

Most Americans eat far too much protein, so be mindful of the amount! I believe it is the rare person who really needs more than one-half gram of protein per pound of lean body mass. Those that are aggressively exercising or competing and pregnant women should have about 25 percent more, but most people rarely need more than 40-70 grams of protein a day.

To determine your lean body mass, find out your percent body fat and subtract from 100. This means that if you have 20 percent body fat, you have 80 percent lean body mass. Just multiply that by your current weight to get your lean body mass in pounds or kilos. To determine whether you're getting too much protein, simply calculate your lean body mass as described above, then write down everything you're eating for a few days, and calculate the amount of daily protein from all sources.

Again, you're aiming for one-half gram of protein per pound of lean body mass, which would place most people in the range of 40 to 70 grams of protein per day. If you're currently averaging a lot more than that, adjust downward accordingly. You could use the chart below or simply Google the food you want to know and you will quickly find the grams of protein in the food.

<p>Red meat, pork, poultry and seafood average 6-9 grams of protein per ounce.</p> <p>An ideal amount for most people would be a 3 ounce serving of meat or seafood (not 9 or 12 ounce steaks!), which will provide about 18-27 grams of protein</p>	<p>Eggs contain about 6-8 grams of protein per egg. So an omelet made from two eggs would give you about 12-16 grams of protein.</p> <p>If you add cheese, you need to calculate that protein in as well (check the label of your cheese)</p>
<p>Seeds and nuts contain on average 4-8 grams of protein per quarter cup</p>	<p>Cooked beans average about 7-8 grams per half cup</p>
<p>Cooked grains average 5-7 grams per cup</p>	<p>Most vegetables contain about 1-2 grams of protein per ounce</p>

- **As much high-quality healthy fat as you want** (saturated³¹ and monounsaturated). For optimal health, most people need upwards of *50-85 percent* of their daily calories in the form of healthy fats. Good sources include coconut and coconut oil, avocados, butter, nuts, and animal fats. (Remember, fat is high in calories while being small in terms of volume. So when you look at your plate, the largest portion would be vegetables.)
- **As many non-starchy vegetables as you want**

- **Exercise regularly and intensely.** Studies have shown that exercise, even without weight loss, increases insulin sensitivity.³² [High intensity interval training](#) (HIIT), which is a central component of my [Peak Fitness program](#), has been shown to improve insulin sensitivity by as much as 24 percent in just four weeks.
- **Improve your omega-3 to omega-6 ratio.** Today's Western diet has far too many processed and damaged omega-6 fats, and is far too little omega-3 fats.³³ The main sources of omega-6 fats are corn, soy, canola, safflower, peanut, and sunflower oil (the first two of which are typically genetically engineered as well, which further complicates matters). Our bodies evolved for an optimal 1:1 ratio of omega-6 to omega-3. However, our ratio has deteriorated to between 20:1 and 50:1 in favor of omega-6. This lopsided ratio has seriously adverse health consequences.
To remedy this, reduce your consumption of vegetable oils (this means not cooking with them, and avoiding processed foods), and increase your intake of animal-based omega-3, such as krill oil. Vegetable-based omega-3 is also found in flaxseed oil and walnut oil, and it's good to include these in your diet as well. Just know they cannot take the place of *animal-based* omega-3s.
- **Maintain optimal vitamin D levels year-round.** New evidence strongly supports the notion that vitamin D is highly beneficial not only for type 1 diabetes as mentioned before, but also in type 2 diabetes. The ideal way to optimize your vitamin D level is by getting regular sun exposure, or by using a safe tanning bed. As a last resort, consider oral supplementation with [regular vitamin D monitoring](#), to confirm that you are taking enough vitamin D to get your blood levels into the therapeutic range of 50-70 ng/ml. Also please note that if you take supplemental vitamin D, you create an increased demand for [vitamin K2](#).
- **Get adequate high-quality sleep every night.** Insufficient sleep appears to raise stress and blood sugar, encouraging insulin and leptin resistance and weight gain. In one 10-year long study³⁴ of 70,000 diabetes-free women, researchers found that women who slept less than five hours or more than nine hours each night were 34 percent more likely to develop diabetes symptoms than women who slept seven to eight hours each night. If you are having problems with your sleep, try the suggestions in my article "[33 Secrets to a Good Night's Sleep](#)."
- **Maintain a healthy body weight.** If you incorporate the diet and lifestyle changes suggested above you will greatly improve your insulin and leptin sensitivity, and a healthy body weight will follow in time. Determining your ideal body weight depends on a variety of factors, including frame size, age, general activity level, and genetics. As a general guideline, you might find a [hip-to-waist size index chart](#) helpful. This is far better than BMI for evaluating whether or not you may have a weight problem, as BMI fails to factor in both how muscular you are, and your intra-abdominal fat mass (the dangerous visceral fat that accumulates around your inner organs), which is a potent indicator of leptin sensitivity and associated health problems.
- **Incorporate intermittent fasting.** If you have carefully followed the diet and exercise guidelines and still aren't making sufficient progress with your weight or overall health, I strongly recommend incorporating [intermittent fasting](#). This effectively mimics the eating habits of our ancestors, who did not have access to grocery stores or food around the clock. They would cycle through periods of

feast and famine, and modern research shows this cycling produces a number of biochemical benefits, including improved insulin/leptin sensitivity, lowered triglycerides and other biomarkers for health, and weight loss.

Intermittent fasting is by far the most effective way I know of to shed unwanted fat and eliminate your sugar cravings. Intermittent fasting has also been identified as a potent ally for the prevention and perhaps even treatment of dementia. Ketones are released as a byproduct of burning fat, and ketones (not glucose) are actually the preferred fuel for your brain. Keep up your intermittent fasting schedule until your insulin/leptin resistance improves (or your weight, blood pressure, cholesterol ratios, or diabetes normalizes). After that, you only need to do it "as needed" to maintain your healthy state.

- **Optimize your gut health.** Your gut is a living ecosystem, full of both good bacteria and bad. Multiple studies have shown that obese people have different intestinal bacteria than lean people. The more good bacteria you have, the stronger your immune system will be and the better your body will function overall. Fortunately, optimizing your gut flora is relatively easy. You can reseed your body with good bacteria by regularly eating fermented foods (like natto, raw organic cheese, miso, and cultured vegetables).

You CAN Prevent and Treat Diabetes

You don't have to be a part of the diabetes epidemic that is taking place before your eyes; you merely need to make some lifestyle changes and be mindful about your habits. The changes, detailed above, will prevent you from heading down the diabetes path, and can be the U-turn you've been looking for if you're already insulin resistant or diabetic. None of these strategies are expensive or overly time-consuming. However, they do require a measure of honest reflection and discipline.

Now that you have an understanding of what diabetes really is and how it develops, you can steer clear of behavior patterns that harm your health, and incorporate those that will enhance your quality of life. Again, type 2 diabetes involves loss of insulin and leptin sensitivity, which is easily preventable, and nearly 100 percent reversible without drugs, by addressing your diet and other lifestyle habits, such as exercise, sleep, and intermittent fasting. I suggest taking a lifestyle inventory to see where you might have room for improvement. For example:

- **Review your eating patterns.** How much sugar and sugar-forming carbohydrates are you eating daily? Is corn syrup a primary staple of your diet, hidden in the processed foods you buy on a regular basis? Are you spending your time in the middle of the grocery store, or around the periphery? (Most processed foods come from the middle aisles.)
- **Are you an "emotional eater"?** Do you tend to overindulge in comfort foods when you are feeling sad or angry? If so, review the information on my website about [EFT](#), which you might find very helpful.
- **Evaluate your activity level.** Are you getting enough exercise each week?
- **Are you getting enough sunlight?** Have you measured your vitamin D levels lately? Unless you are deeply tanned, that is the only way to know your level. Do you need to consider a vitamin D supplement?

- **Are you getting enough magnesium in your diet?** Early signs of magnesium deficiency include loss of appetite, headache, nausea, fatigue, and weakness. An ongoing magnesium deficiency can lead to more serious symptoms, including muscle spasms and abnormal heart rhythms. To learn more, please see my interview with [Dr. Carolyn Dean](#), author of *The Magnesium Miracle*.
- **What patterns are you inadvertently passing along to your children?** What example are you setting for your kids, in terms of nutrition and exercise? Are they getting the message that health is a priority? Getting healthy can and should be a family activity! When everyone is involved, you can support each other and give kudos for positive strides, making it more fun for everyone. The payoffs to your health will be great, and you will be passing along good lifestyle habits to your children, which will serve them for years to come.