Carbohydrates Increase Death Rates

Health authorities have told us to eat more carbohydrates – “healthy whole grains” – for the past several decades, as a benign alternative to allegedly deadly saturated fat. Their story is now unraveling, as recent and divergent lines of evidence point to carbohydrates as detrimental to lifespan and healthspan. In this article we’ll look at the evidence that dietary carbohydrates increase death rates.

The PURE Study

The PURE Study looked at over 135,000 people in 18 countries, and tracked what they ate and at what rate they died. The study found that dietary carbohydrates were positively associated with death and cardiovascular disease rates, and dietary fat was negatively correlated, i.e. the more dietary fat, the lower the death and disease rate. Results shown in the graph below.
This is an epidemiological study and therefore cannot prove causation.

Nevertheless, at least a couple other epidemiological studies have found the same: 1) **carbohydrates, not saturated fat, are associated with cardiovascular disease**; 2) “high carbohydrate consumption (mainly in the form of cereals and wheat, in particular) as the dietary factor most consistently associated with the risk of CVDs” (ref.)
What about evidence beyond epidemiology? If animal and other evidence supports it, then we can have better confidence in the result.

**Ketogenic diets increase lifespan**

A ketogenic diet extends longevity and healthspan in adult mice. ([Ref.](#))

In fact, ketogenic diets may be equivalent to fasting and/or calorie restriction in their effects on lifespan and health. (I wrote about that [here.](#)) Since calorie restriction is the most robust lifespan-extending intervention yet found, if a ketogenic diet produces the same result, that’s great news.

You wouldn’t have to restrict calories in order to get longer life and better health, you would merely restrict carbohydrates, and [eat as much as you wanted.](#)

Much interesting new research proposes that calorie restriction produces its benefits via ketones. “Ketone bodies mimic the life span extending properties of caloric restriction”.

**Benefits of fasting due to fewer carbohydrates**

Intermittent fasting duplicates many of the physiological benefits of calorie restriction.

Much of the benefit of fasting may be due to the absence of carbohydrates.

One study calculated that 100% of the changes wrought by fasting was due to eating no carbohydrates. [Carbohydrate restriction regulates the adaptive response to fasting.](#) When volunteers either fasted for 3.5 days, or got an
infusion of lipid for the same time, “Changes in plasma glucose, free fatty acids, ketone bodies, insulin, and epinephrine concentrations during fasting were the same in both the control and lipid studies.”

Oncologist Rainer Klement wrote: “I propose carbohydrate restriction as probably the best way to mimic CR [calorie restriction] in humans without the need to restrict energy intake.” (Ref.)

Another study estimated that 71% of the lowered glucose seen in short-term (24-hour) fasting may be due to no carbohydrates. (Ref.)

Acarbose and metformin

Acarbose is an anti-diabetic drug that inhibits an enzyme responsible for uptake of glucose from the intestines, and it increased lifespan by by 22% in male mice, 7% in female. (Ref.) In humans, acarbose dramatically reduced the incidence of cardiovascular events in diabetics. (Ref.)

Since carbohydrates break down into glucose upon ingestion, and acarbose prevents that and increases lifespan and lowers the rate of CVD, then it seems that simply not eating carbohydrates would do the same.

Metformin is another anti-diabetic drug that lowers glucose and insulin by inhibiting gluconeogenesis, the production of glucose from amino acids and fats in the liver. Diabetics who take metformin may live longer than non-diabetics who do not take metformin. (Ref.)

That’s a startling fact, but must be tempered by the knowledge that even most non-diabetics in this day and age have high insulin and impaired glucose tolerance.

Metformin also increases lifespan in lab animals. (Ref.) “Treatment with metformin mimics some of the benefits of calorie restriction, such as improved physical performance, increased insulin sensitivity, and reduced low-density lipoprotein and cholesterol levels without a decrease in caloric intake.” [My emphasis.]

Metformin mimics CR, which is recapitulated by fasting, which is all (or mostly) about carbohydrate restriction.

By the way, there’s even a rapamycin connection here. Rapamycin, a drug that extends lifespan, also results in the production of ketones and better insulin sensitivity. (Ref.)

And a ketogenic diet inhibits the mechanistic target of rapamycin (mTOR). (Ref.)

Conclusion

Multiple lines of evidence lead to the conclusion that dietary carbohydrates, especially refined grains and starches, promote mortality and are bad for health.
Decreasing carbohydrates, either entirely via a ketogenic diet, or even somewhat, improves health and increases lifespan.

If you want to avoid these carbohydrates, then avoid the following foods:

- breakfast cereal
- bread, tortillas, naan, bagels
- pasta
- pizza
- donuts, candy
- soft drinks, fruit juice
- potatoes.

PS: If you need to lose weight and you want to save yourself years of poor results from bad information, I’ve put everything in a simple guide for you. The World’s Simplest Fat-Loss Plan.
Iron Supplements Increase Infection Risk

It’s been known for some time that iron supplements increase infection risk, because people who take them have more infections. A recent report clarifies some mechanisms.

Evidence for increased infections with iron

Many people in the tropics, especially children, are iron-deficient, given both the relative lack of dietary meat and high rates of intestinal parasites and malaria, so naturally doctors would like to fix that. Unfortunately, the most direct way, giving iron supplements, often backfires.

For example, giving iron to nomads in Somalia greatly increased the number of infections, compared to those who took a placebo.

Seven episodes of infection occurred in the placebo group and 36 in the group treated with iron; these 36 episodes included activation of pre-existing malaria, brucellosis, and tuberculosis. This difference suggested that host defence against these infections was better during iron deficiency than during iron repletion. Iron deficiency among Somali nomads may be part of an ecological compromise, permitting optimum co-survival of host and infecting agent.

Giving iron to children increases their risk of diarrhea and malaria, which in some cases requires hospitalization and can kill the patients. Many other reports (e.g.) and reviews describe similar findings.
Bacteria thrive with iron supplements

This next study is quite neat, since it’s simple and straightforward.

A group of adult male volunteers in the Gambia gave a blood sample. They then took one dose of ferrous sulfate, an iron supplement, at 400 mg, which is a typical or even low dose of iron. They then gave another blood sample. Both samples were centrifuged, and the serum was used to grow bacteria. The researchers discovered that oral iron acutely elevates bacterial growth in human serum.

*Escherichia coli*, *Yersinia enterocolitica* and *Salmonella enterica* serovar Typhimurium (all gram-negative bacteria) and *Staphylococcus epidermidis* (gram-positive) showed markedly elevated growth in serum collected after iron supplementation. Growth rates were very strongly correlated with transferrin saturation (p < 0.0001 in all cases). Growth of *Staphylococcus aureus*, which preferentially scavenges heme iron, was unaffected. These data suggest that even modest oral supplements with highly soluble (non-physiological) iron, as typically used in low-income settings, could promote bacteremia by accelerating early phase bacterial growth prior to the induction of immune defenses.

Bacteremia means a blood infection with bacteria, and is a serious, life-threatening condition. Also known as sepsis or septicemia, it’s ranked number 10 in the list of leading killers of people over 65 years old in the U.S.

Below are growth curves for bacteria in serum before iron supplementation (blue lines) and after (red lines).

![Growth curves for bacteria](image)

The y-axis on these charts is a log scale, x-axis is time, so the charts indicate doubling times and final concentration of bacteria. The bacteria grew far faster in serum from individuals after iron supplementation.

Bacteria and other microorganisms require iron

Why should bacteria grow so much faster with excess iron?
The answer is that bacteria, like virtually all living things, require iron for growth. However, in humans and other animals, iron is tightly controlled and sequestered, and one of the main reasons for this is to stop bacteria from acquiring iron.

Control of iron is an important part of the innate immune system.

The frontline of host-pathogen coevolution

Pathogens have to subvert a host’s innate defenses to avoid being killed. Barber and Elde now show that this principle extends to nutrient-transporting proteins, such as transferrin, which binds iron. Without iron, invading pathogens cannot replicate, but iron is sequestered in transferrin, which stops pathogens using it. So pathogens have evolved a succession of transporters that can hijack transferrin’s iron. Over time, the primate transferrin binding surface has coevolved to wrestle iron back from the grip of pathogens.

Transferrin is the protein molecule used to transport iron in the bloodstream, and it’s been suggested that infusions of transferrin could be used in the treatment of septicemia.

Meat is a better source of iron

If someone were iron-deficient, a better way to get iron is eating meat. The iron in meat is heme iron, as opposed to the non-heme (unbound) iron in iron tablets. Heme iron is handled more safely by the body, and doesn’t result in spikes of iron in the bloodstream. In addition, heme iron doesn’t cause excess free iron in the gut, so bacteria can’t get it and use it for growth.

Iron supplements increase infection risk

Iron supplements increase the risk of infection.

In the U.S., all flour, corn meal, and rice must be iron-fortified by law. Is this increasing the rate of infections? How many people with gut dysbiosis and other problems such as irritable bowel syndrome owe their problems to iron fortification or supplementation? How many people with septicemia, the 10th leading cause of death among the elderly, got that way due to iron?

No one knows.

PS: For more on the effects of excess iron, see my book, Dumping Iron.
Is Fruit Healthy?

The idea that fruit is a health-giving food, or even that eating fruit is actually necessary for good health, is firmly entrenched in current dietary dogma. We’re told that we must eat at least 5 servings of fruits and vegetables daily for good health, with some recommendations going as high as 10 servings. But is fruit healthy, and do we really need to eat it for good health? Several considerations could lead us to an answer in the negative.
What our ancestors ate

Any consideration of whether a particular food or certain quantities of that food are beneficial for health necessarily depends on whether humans evolved to eat it. While some primates, to whom humans are related, eat lots of fruit, humans have evolved independently for a couple of million years or so, depending on how “human” is defined.

Hunter-gatherers are those groups of people that live without agriculture, and researchers have studied them and their diets extensively.

Since the origins of agriculture around 10,000 years ago, agriculturalists have pushed hunter-gatherer groups into more marginal areas, so how close the contemporary hunter-gatherer diet and lifestyle is to that of our paleolithic ancestors is an open question.

With that caveat in mind, contemporary hunter-gatherers consume a diet in which, on average, meat provides 65% of calories, the rest coming from plant foods. Our paleolithic ancestors may have consumed even greater amounts of meat, since they didn’t live on marginal land, the human population of the world was small, and many more large, wild animals roamed.

Did they eat fruit, and are humans adapted to eating it? Modern fruit consumption is based on agriculture and preservation, such as canning or refrigeration, and those certainly didn’t exist in the paleolithic era, so it’s a good assumption that if they did eat fruit, they would not have eaten nearly as high a quantity of it as modern people.

Paleolithic fruit eating could have taken the form of gorging on it when it was abundant and meat was scarce, in which case, fruit wouldn’t have been available year-round as it is for us moderns.

I’ve lived in the tropics myself, and virtually the only fruit I saw people there eat was mangoes. Mangoes ripen over the space of a few weeks and if not eaten then, fall to the ground and rot, so for a few weeks time, everyone eats mangoes like they’re going out of style – which they are, in a sense.

Optimal foraging theory

Optimal foraging theory applies economics to an animal’s acquisition of food. Like any other economic good, time and energy must be used to acquire food, and an animal attempts to spend the least time and energy for the most reward, or the greatest return on investment.

It seems that in most cases, optimal foraging theory points to meat as the preferred food of humans, since it is high in calories and protein. Fruit is not. A single large animal could feed a group of humans for days, while a lot of fruit would have to be gathered to feed the same number of people, arguably entailing a lot more work. Even then, fruit wouldn’t provide enough necessary protein, assuming that enough fruit could be gathered, which seems unlikely except perhaps sporadically. Golden Delicious apples didn’t grow in groves back then.
So, both theory and evidence point towards the consumption of large amounts of meat during the Paleolithic era. Nevertheless, humans probably ate fruit when necessary, when they were hungry, no meat was to be had, and fruit was available.

But what was that fruit like?

**Wild vs domestic fruit**

These are wild bananas:

They’re much smaller and contain less edible material than modern bananas, which have been bred to have high sugar content.

One modern banana provides about 105 calories, of which almost all comes from sugars. It provides only 1 gram of protein. And, since bananas are grown, shipped, and stored using industrial technology, we can eat as many bananas as we like.

If sugar is bad for us, it doesn’t seem likely that just because it’s in a banana, it’s good.

The same considerations apply to other fruits: modern fruit is larger and contains more sugar because it’s been bred to be so, and it’s grown using modern methods resulting in abundant output, and then transported from the tropics or other areas to the point of purchase. In paleolithic times, none of that applied.
Modern era

What about more recent eras, such as the 18th or 19th centuries? Obesity and other diseases of civilization were uncommon then, and if people ate much fruit, then perhaps we could say that fruit was healthy, or at least benign.

In the 18th and 19th centuries, Americans did not eat very much in the way of fruits and vegetables. Meat was abundant, and even the poor ate plenty of it. Fruits and vegetables had a short growing season and were ripe for only a short period of time, and in the absence of refrigeration and transport, spoiled, as Nina Teicholz writes:

Even in the warmer months, fruit and salad were avoided, for fear of cholera. (Only with the Civil War did the canning industry flourish, and then only for a handful of vegetables, the most common of which were sweet corn, tomatoes, and peas.)

So it would be “incorrect to describe Americans as great eaters of either [fruits or vegetables],” wrote the historians Waverly Root and Richard de Rochemont. Although a vegetarian movement did establish itself in the United States by 1870, the general mistrust of these fresh foods, which spoiled so easily and could carry disease, did not dissipate until after World War I, with the advent of the home refrigerator. By these accounts, for the first 250 years of American history, the entire nation would have earned a failing grade according to our modern mainstream nutritional advice.

What about apples – fruit, obviously – didn’t Americans eat them? Johnny Appleseed is famous for spreading apple trees around the country. But it turns out that much of the apple crop was turned into apple cider. Not only did cider provide alcohol, but it’s a way to preserve and concentrate apples in the absence of refrigeration and transport.

Sugar

Modern fruit is typically loaded with sugar, although there are some exceptions. As noted above, bananas are sweet, with about 93% of calories as carbohydrates, most of that sugar. Apples are similar in composition, as are pears.

Even if it is argued that fruit contains protective or beneficial elements, which may be true, all that sugar does little good other than as an energy source, and energy sources are not in short supply these days. Fruit is a poor source of protein as well.

Berries are somewhat of an exception, with raspberries for instance containing about 33% sugar as calories. Avocados are low in sugar as well, although they don’t usually spring to mind when most people think of fruit.
Modern fruits are big bags of sugar, having been bred to be that way. If we avoid sugar in other forms, it seems odd that sugar would be beneficial just because it’s in fruit. Sugar is a huge net negative for fruit in my opinion.

**Phytochemicals and hormesis**

Fruits (and vegetables) are thought to be healthy due to the phytochemicals, largely polyphenols, that they contain. Phytochemicals in turn may be beneficial because they stimulate **hormesis**, the process in which low doses of a toxin or other stress produce beneficial changes in our bodies.

However, *coffee, tea, red wine, and chocolate* all generally provide far more polyphenols than fruit. With the exception of chocolate, they have the added benefit of being entirely sugar-free, and even chocolate can be consumed without sugar or in low-sugar forms such as dark chocolate. So, if you want to consume polyphenols, and you consume coffee, etc., then fruit would be superfluous.

**Teeth**

Sugar rots teeth, and as we’ve seen, most fruit is loaded with sugar.

It could be argued, and I do argue, that any food that rots teeth isn’t meant for human consumption, that we have not evolved to consume it and remain healthy. Mainstream health authorities mostly deny this. But rotten teeth can be a serious health problem if untreated, leading to abscesses, pain, even death from septicemia, so evolution would certainly select for the ability to maintain healthy teeth. The fact that we can’t maintain healthy teeth today absent specialized care and treatment speaks volumes for the suitability of our food.

*Fruit juice may be especially harmful in this regard,* and *it’s harmful in more ways than that.*

**Fiber**

Fruit has lots of fiber. Don’t we need that?

Not really; in any case, *it’s highly overrated.*

**Vitamin C**

One of the few vitamins in which animal foods are relatively low is vitamin C, and fruits do contain vitamin C. However, a number of vegetables, such as red chili pepper and broccoli, *contain more vitamin C than oranges.* So it’s not necessary to consume fruit to get abundant vitamin C. Besides vitamin C, fruit contains little in the way of other vitamins and minerals that can’t be found more abundantly elsewhere.
Summary

Humans likely did not evolve to eat much fruit, certainly not year round and not in the abundance that we do today. Further, whatever fruit that early humans did eat was lower in sugar than modern fruit.

Even in the modern era, it wasn’t until after World War I and the spread of modern refrigeration that people ate lots of fruit. Before that, fruit was seasonal and much of it (apples) was used to make alcohol.

Modern fruit is loaded with sugar, is low in protein, and appears to provide not a lot of added benefit compared to other foods.

Fruit isn’t necessary or even particularly beneficial, and certain aspects of it could be harmful. I rarely eat it.

PS: A healthier thing to rather than eating fruit is Dumping Iron.

PPS: Check out my Supplements Buying Guide for Men.

PPPS: If you enjoyed this article, hit me with a donation at my PayPal.

Bitcoin: 32eTsLyi484gTcmEEYkAmyCwzhmDfqfwdN
Guest Post: The Dangers of Estrogen Dominance in Men

The Dangers of Estrogen Dominance in Men

by Sean Ward

Males are biologically made to produce testosterone at a higher level than women. However, thanks to our modern society, and our tendency to adopt new trends without doing scientific research on them, the balance of hormones in the body has been affected.

We’ve written this article to help people like you understand why estrogen is important, but also to understand why too much of it is bad for your health. Hopefully, you’ll learn enough by the time you’re done reading this to make a good decision for your health.

The Importance of Estrogen in The Male Body

Just because estrogen is the ‘female hormone’ doesn’t mean that men don’t need a healthy supply of it. It regulates the growth of our bones and the way we process cholesterol.

It’s important that you maintain a fine balance of estrogen, because both too much and too little of it can cause a heck of a lot of problems for men.

Problems That Arise From High Estrogen:

- **Estrogen increases the body’s stress hormone**, also known as cortisol. Cortisol can lead to blood sugar problems, ultimately leading to diabetes, or other weight-related problems like obesity. Too much cortisol can also increase your desire for high carb, high calorie foods.
that can all contribute to these problems.

- Unhealthy levels of estrogen can have negative impacts on the sex drives of both males and females. It becomes much harder for men to achieve and maintain erections if their estrogen levels are too high, which can vastly impact their sex lives.

- **High levels of estrogen can cause mental issues** as well. If your estrogen levels are not balanced you may find yourself more prone to mood swings, depression and mania. Estrogen imbalances can also lead to difficulties with memory.

- Other side effects of too much estrogen include excessive weight gain, chronic fatigue and headaches, as well as urinary tract infections and loss of muscle mass.

- One of the most cumbersome factors of having too much estrogen is that it increases the size of the prostate. This significant increase in prostate size affects its function and ultimately increases the chances of developing prostate cancer.

**So, what should I do if I have too much estrogen?**

If you’re experiencing the symptoms above, don’t rush to assume that you have problems with your estrogen levels. There may be other causes of your symptoms.

However, if you’ve tried other alternatives with no success, or have noted a huge number of these symptoms present at the same time, it might be a good idea to consider trying to balance your estrogen levels.

**There are several ways you can attempt to balance your estrogen levels.**

The first thing you should do is consider the reason your estrogen levels are imbalanced. The most common cause of estrogen imbalance is natural: as men age, their bodies produce much higher levels of aromatase.

This enzyme is responsible for converting testosterone into estrogen – a perfectly normal process.

However, as men age, the levels of which testosterone is converted into estrogen often become higher than is necessary.

While it’s a good idea for men to consume healthy amounts of dietary fats to ensure their body can produce testosterone, body fat is another matter. Excess body fat results in the production of more aromatase, leading to higher estrogens – estradiol and estrone.

Too much of it will provide you with too much testosterone conversion and too much space to store your estrogen.

There are some nutritional options that you can opt for if you seek to reduce the levels of estrogen in your body. The two main nutrients are calcium-d-glucarate and diindolylmethane.
- **Calcium-d-glucarate** is a nutrient with many powerful benefits that include lowering the chances of getting cancer, helping your body process protein, and most importantly for us, removing excess estrogen from the body.

- **Diindolylmethane (DIM) is a substance** that’s naturally produced by the body when it consumes indole-3-carbinol which is a nutrient found in many vegetables, particularly in those of the cruciferous family.

- It is possible to directly supplement DIM through supplements you can purchase at your health food store or local pharmacy, but the most effective route is allowing your body to produce its own DIM by eating a healthy diet full of cruciferous vegetables.

DIM works wonders for maintaining the balances of estrogen and testosterone both.

Another great alternative for balancing estrogen levels is to supplement with a hormone known as progesterone. Progesterone helps the human body balance its estrogen levels and ensures that you don’t have either too much or too little.

It’s important to seek your doctor’s advice before starting any supplemental regime, but it’s particularly vital for you to consult a physician before starting to supplement any hormones.

Hormones have direct and powerful functions on many of your body’s systems and they can have plenty of effects, interactions, or conflicts with other supplements or conditions you may be taking.

It’s also vital to let your doctor know if you’re taking any other supplements, medicines, and even vitamins. These can all interact with new hormonal or other supplements.

**In conclusion**

Estrogen is a necessary hormone for both men and women. However, it’s important to make sure that you strike a fine balance of estrogen. This problem becomes very apparent in men who have too much estrogen, developing a condition known as estrogen dominance.

Estrogen dominance is a serious problem for both genders but the effects can be debilitating for men. The symptoms are diverse and severe and can impact every area of a man’s life – particularly his sex life.

There are various solutions available for balancing estrogen levels in the male body. Most of these solutions are simple cases of supplementing with the right nutrients or eliminating the wrong nutrients. However, it’s important to remember that consulting your doctor should take precedence over any supplementation.

Estrogen dominance is a serious problem that shouldn’t be taken lightly, and we hope we have helped you learn something today.
By Sean Ward, Founder of Naturally Boost Testosterone, a men’s health blog dedicated to providing natural ways for men to boost hormone levels. Check out www.naturally-boost-testosterone.com to learn more about Sean and his work. You can also find him on Twitter, Pinterest and Facebook.

PS (from P.D. Mangan): For more on aromatase, see my latest book, Best Supplements for Men.

PPS: Check out my Supplements Buying Guide for Men.

How to Increase Insulin Sensitivity,
**and Why**

Insulin sensitivity means how sensitive the cells of the body are to the effects of insulin, the hormone that promotes the uptake of nutrients, especially glucose, into cells. Good insulin sensitivity is crucial for good health as well as healthy aging. Here we’ll discuss how to increase insulin sensitivity, and why.

**Why should you increase insulin sensitivity?**

Let’s start with the “why” first, since learning why insulin sensitivity is important will motivate you to get and maintain it.

When you eat any kind of food (other than pure fat), the beta cells of the pancreas secrete insulin so that nutrients enter cells to be used for energy, growth, and repair.

If your body requires only a minimal amount of insulin to do this job, you are highly insulin sensitive.

The opposite of insulin sensitivity is insulin resistance, which is any condition in which the body requires more than the minimum for nutrients to enter cells. Insulin resistance is strongly associated with obesity, although many normal weight people are also insulin resistant. To compensate for insulin resistance, the pancreas produces more insulin, leading to hyperinsulinemia.

You should care about insulin sensitivity because it is associated with many diseases, most notably type 2 diabetes, but also heart disease and cancer.

When insulin resistance gets very high, and the body can no longer produce
enough insulin to compensate, blood glucose rises and type 2 diabetes exists.

**Insulin resistance, not cholesterol, is one of the main causes of heart disease.** High blood insulin, or hyperinsulinemia, very likely plays a **major role in the development of cancer.**

In lab animals, even small (~25%) decreases in circulating insulin levels **result in a substantial increase in lifespan.**

**Why does insulin sensitivity decrease?**

When you eat carbohydrates, they are broken down to glucose for use as fuel.

If you ingest more carbohydrates than can be readily burned, the resulting glucose is made into glycogen, the storage form of glucose, and stored in the liver and skeletal muscles. The glycogen in the liver is used to maintain a constant supply of blood glucose, and muscles keep glycogen on tap for use at high intensities of exertion.

If you don’t regularly use up your stored glycogen, and/or you ingest too much high-carbohydrate food, the liver and muscles become essentially saturated with glycogen, and the cells with glucose.

**Insulin resistance results.** Insulin resistance is the cells’ way of saying “No more glucose, please.”

In insulin resistance, insulin levels in the blood rise to compensate for decreased efficiency. Ultimately, diabetes can result.

**How to increase insulin sensitivity**

There are two main ways to increase insulin sensitivity:

1. diet
2. exercise.

**Diet:** In the case of diet, the answer to increased insulin sensitivity is simple: cut the carbohydrates.

A low-carbohydrate diet, at 21 grams a day (which is very low and induces ketosis), and **not restricted in calories**, caused a **75% increase in insulin sensitivity in only 14 days in obese patients with type 2 diabetes.** It also resulted in 1.65 kg (3.6 pounds) of weight loss in the same time period. Note that calorie intake spontaneously decreased by over 1000 calories a day, so the improved insulin sensitivity may be due to either lower carbohydrate itself, or improved satiety through less carbohydrate and more fat and protein causing lower calorie intake. Either way, it works.

**A so-called low carbohydrate diet consisting of 35% of calories as carbohydrate failed to improve insulin sensitivity.** That’s not really a low-carbohydrate diet, so no wonder they didn’t get good results.
The reason for low-carbohydrate diets increasing insulin sensitivity is simple: you quit flooding your system with glucose. Eventually, the glycogen tank declines, and insulin sensitivity increases. You’re no longer trying to stuff glucose into an overfilled tank.

To increase insulin sensitivity through your diet, eat little or no refined carbohydrates (basically anything made with flour such as bread and pasta), no sugar, and no vegetable oils. Omega-6 fatty acids from vegetable oils initiate or aggravate insulin resistance, while omega-3 fatty acids from fish and fish oil prevent insulin resistance.

Fasting and/or a very low calorie (crash) diet may not only increase insulin sensitivity but cure diabetes.

**Exercise:** Exercise, both aerobic exercise and resistance training (weightlifting) increase insulin sensitivity.

In exercise, the body burns both fat and carbohydrate (glycogen). At low intensity, say walking, fat-burning predominates. At high intensity, the body uses a higher proportion of glycogen.

Therefore, high-intensity exercise ought to burn more glycogen and improve insulin sensitivity the best. Does it?

Indeed, a mere two weeks of high-intensity interval training (stationary cycling), for a total of 6 sessions, increased insulin sensitivity by 35%. GLUT4 receptors, which take up glucose into muscles, increased in number comparably to high volume endurance training.

Another study showed that only two weeks of high-intensity interval training, for a grand total of 15 minutes of exercise over the two weeks (sic), improved insulin sensitivity. The subjects were young, healthy men, not diabetics.

Increasing your insulin sensitivity through exercise is a matter of both intensity, and volume. If you exercise at lower intensity, you need more volume, since you won’t be burning as much glycogen. At high intensity, much less volume is required to increase insulin sensitivity.

The same applies to lifting weights: insulin sensitivity improves more when you lift at high intensity.

**Conclusion**

Good insulin sensitivity is critical for health, arguably one of the most critical factors for staying healthy.

Insulin sensitivity is mainly a result of lifestyle factors, notably a diet low in refined carbohydrates, sugar, and industrial seed oils, as well as exercise. High-intensity exercise is particularly good for increasing insulin sensitivity, since it helps burn glycogen and deplete glycogen storage.
The Low-Salt Fiasco

For several decades, mainstream health authorities have recommended that we avoid saturated fat in our food and keep our cholesterol low. For about the same length of time, they’ve also warned us about the dangers of salt: that it causes hypertension – high blood pressure, a major risk factor for cardiovascular disease – and that we should all keep our salt intakes low, as low as possible. The first dogma, on cholesterol and fat, has come under
increasing scrutiny and skepticism in recent years, exemplified by books like Good Calories, Bad Calories and The Big Fat Surprise. Now, James DiNicolantonio’s new book, The Salt Fix, aims to do for salt what others have done for fat and cholesterol.

Why low salt?

Humans have prized salt and gone out of their way to get it since before recorded history, and animals also seek it out. And of course they do, since salt is a required nutrient.

Chemically, ordinary table salt is sodium chloride, and it makes up about 90% of all minerals in the blood and other body fluids, and is present at a concentration of about 0.8%. Given its importance in maintaining electrolyte balance, the body closely regulates the concentration of sodium and chloride, mainly through the action of the kidneys and various hormones secreted by them and acting on them. Both abnormally low and abnormally high blood sodium lead to, or are associated with, serious illness and even death.

Prehistoric humans and modern hunter-gatherers seek out salt, and DiNicolantonio cites evidence that salt consumption in Europe a few hundred years ago – 16th to 18th centuries – was many times higher than today. Due to the use of salt as a food preservative, early modern Europeans consumed 40 to 70 grams of salt daily, and in some places as much as 100 grams, compared to the average American’s current consumption of about 8 grams, or about 3.4 grams of sodium. (Keep in mind that sodium makes up about 40% of the weight of salt, and authorities often speak in terms of sodium, not total salt, consumption, so the numbers can be confusing.)

Salt consumption in the U.S. has been quite stable since the first half of the 20th century, yet the rate of hypertension is about 3 times higher. So why have health authorities argued that decreasing salt intake is critical for controlling hypertension?

DiNicolantonio traces the history of how the low-salt ball got rolling, and that story bears many similarities to the
story of Ancel Keys and saturated fat. Several researchers became convinced, through dubious experiments and case reports, that salt caused hypertension, and went on a crusade to convince doctors and the public that salt was a villain.

Among those researchers was Dr. Walter Kempner, who devised the well-known (or infamous, perhaps) Kempner Rice Diet, which he put into use at a clinic for the treatment of severe hypertension, at a time when no drugs were available to treat it. The Kempner Rice Diet was low in sodium, protein, and calories, and consisted mainly of rice, sugar, fruit, and fruit juice. Kempner made extraordinary claims for his diet, but even by his own less-than-scientific standards, it didn’t help everyone, and in those it did help, results were modest. It also led to serious illness in some patients. Other researchers were unable to replicate his results. Furthermore, the diet was low in calories and caused weight loss, which may have been responsible for whatever success it had in lowering blood pressure.

A later study done at the Cleveland Clinic found that a low salt diet helped only about 25% of severe hypertensives, and even then results were modest.

Nevertheless, due to relentless campaigning, the McGovern committee recommended in 1977 that Americans limit their salt intake to 3 grams daily (about 1200 mg sodium). This was the same committee that recommended we stay away from saturated fat.

Low salt has less than impressive results and may be harmful

Severe sodium restriction has little effect on the blood pressure of normotensives, that is, people with normal blood pressure; it lowers their systolic blood pressure by around 1 mm Hg, or less than about 1%. Around 80% of normotensives see no rise in blood pressure from increased salt intake; among hypertensives, around 55% are unaffected by salt, and a reduction of sodium intake in them leads to an average
reduction in systolic blood pressure of only about 3.6 mm Hg, an unimpressive result.

It’s even possible that blood pressure can rise with low salt intake, since low salt activates the renin-angiotensin system, the purpose of which is to raise blood pressure. As we saw in a recent article, inhibition of the renin-angiotensin system can increase lifespan even beyond its effects on blood pressure, so higher salt could be life-extending by decreasing renin-angiotensin activation. (Although that’s my idea, and not from the book.)

Low salt consumption leads to a higher heart rate, which is independently associated with higher mortality. Therefore any benefit from lower blood pressure could be negated by a higher heart rate.

Low salt consumption could even lead to obesity, since if we’re starving for salt we may eat more food to get it.

Increasing our salt intake may even be a healthy thing to do.

DiNicolantonio cites fascinating evidence regarding the effects of salt on sex and reproduction. In livestock, cutting sodium reduces birth weights and litter size, and may act as a “natural contraceptive”. In humans, low salt causes a reduced sex drive, reduced odds of pregnancy, increased erectile dysfunction, fatigue, and poor sleep.

How much salt do we really need? DiNicolantonio believes that we have a “salt set point” that “seems to hover around 3 to 4 grams of sodium per day”. (Around 7 to 10 grams of salt.) While sodium balance can be maintained on a low salt intake, that doesn’t mean that that intake is optimal. We may be driven to maintain a sodium surplus, since someone with enough or excess sodium is more likely to survive a sodium-depleting event such as blood loss, diarrhea, or infection. More salt may also be required for heavy exercise, low-carbohydrate diets, and in pregnancy and lactation.
If salt didn’t cause the rising epidemic of hypertension, what did? The author makes a good case for our huge consumption of sugar, and the obesity that goes with it.

**The low-salt fiasco**

Ultimately, there seems no good reason for a population-wide restriction of sodium consumption, and in fact the urging of health authorities for everyone to restrict sodium may be doing considerable harm. In hypertensives, sodium restriction may benefit some, but even there, results may be modest and harm may result.

For most of us, limiting salt probably does more harm than good. Far from being a health panacea, eating less salt may be another fiasco brought about by bad science and overzealous health authorities.

Full disclosure: I’ve had a good deal of online contact with James DiNicolantonio, consider him a friend, and he sent me the book for review.

**PS:** My new book is [Best Supplements for Men](#).

**PPS:** Check out my [Supplements Buying Guide for Men](#).
Best Supplements for Men: My New Book, Coming Soon

Just want to put all my peeps on notice that my new book, Best Supplements for Men: For More Muscle, Higher Testosterone, Longer Life, and Better Looks, will be out soon.

Smart people lift weights.
Smart people eat whole, unprocessed food, and avoid sugary, processed garbage.

And smart people supplement wisely.

CHEKD + Rogue Health and Fitness
Optimized Health

I’ve teamed up with Aaron Grossman, M.D. of CHEKD to offer comprehensive lab testing and medical exams.

Dr. Grossman founded CHEKD to provide a network of physicians who are able and willing to test patients for testosterone and to treat with testosterone replacement therapy if warranted; and to test for iron and treat with therapeutic phlebotomy if warranted.

Health Optimization

CHEKD + Rogue Health and Fitness offers health optimization for those, men and women, who want to take their health to the next level.

- **Expert Consult**: Discuss your results with an actual Health Professional who understands what Real Optimization means. **Yes, an actual conversation.**
• **Personalized:** Protocols and plans tailored to your actual numbers and personal goals. **Only what you need, nothing more.**
• **#1 Across the Board:** We only provide the best Practitioners, Pharmacies and CLIA Certified Laboratories. **American Made.**

**CHEKD + Rogue Health and Fitness** offers four levels of testing and examination, three of which come with a complete physical exam by a qualified physician.

**Testosterone Replacement Therapy**

Given the epidemic of low testosterone, many men are interested in testing and treatment, but finding the right doctor can be difficult. Many, probably most, doctors won’t treat with TRT (testosterone replacement therapy). Even if you can find a doctor, he may not be in your area.

CHEKD offers a network of physicians who are willing to test for low testosterone, and treat it if necessary, and within this network you can find a doctor near you.

**Therapeutic Phlebotomy**

If you have excess ferritin (iron), blood donation is the quickest and most sure way of dealing with it. But some people are ineligible to donate blood. Plus it can be a hassle.

Therapeutic phlebotomy works just like a blood donation, but the blood is discarded instead of transfused into another person. In addition, blood donors must wait 8 weeks between donations, while therapeutic phlebotomies can typically be scheduled more often, and when you want.

However, just as with TRT, few doctors even recognize a problem with excess iron unless it’s very high, and most are also unwilling to order a therapeutic phlebotomy unless the same conditions are met, that is, very high iron.

If you want to take your health to the next level, take a look at CHEKD.

Read testimonials here.

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**Possible Toxicity of Green Tea Extract**

There are **reports of possible liver toxicity** with high doses of green tea extract (GTE), and since I’ve discussed GTE on this site, I felt I should address the issue of the possible toxicity of green tea extract here also.
The report mentions “dozens of cases” since 1999, and also that they’re caused by “high doses”, so given the huge number of people who have taken it for the past 18 years, the potential for toxicity is probably low. However, we can’t be sure.

The National Library of Medicine states:

Drinking green tea has not been associated with liver injury or serum aminotransferase elevations; indeed, cross sectional studies suggest that heavy use of green tea is associated with lower serum ALT and AST values. Nevertheless, case series and a systematic review by the United States Pharmacopeia illustrate evidence for the potential for green tea extract to cause hepatotoxicity. The prevalence of green tea extract induced liver injury is not known, but is probably low in comparison to the wide scale use of these products. Liver injury typically arises within 3 months, with latency to onset of symptoms ranging from 10 days to 7 months. The majority of cases present with an acute hepatitis-like syndrome and a markedly hepatocellular pattern of serum enzyme elevations. Most patients recover rapidly upon stopping the extract or HDS, although fatal instances of acute liver failure have been described. Biopsy findings show necrosis, inflammation, and eosinophils in a pattern resembling acute hepatitis. Immunoallergic and autoimmune features are usually absent. A small number of similar cases have also been described after drinking green tea “infusions” rather than taking oral preparations of extracts of green tea.

The most prominent regulatory action against green tea containing products concerned Exolise, a weight loss product which was withdrawn from Spain and France in 2003. Also, green tea is an ingredient in other supplements including most over-the-counter weight loss agents, some of which have been implicated in causing rare instances of clinically apparent acute liver injury.

While instances of liver injury appear to be rare, given the severity of liver injury, it may not be a good idea to take green tea extract.

I’ve taken green tea extract myself, but will now be stopping.
Guest Post: How to Make the Most of Your Time

This is a guest post by Jennifer Landis, who writes at Mindfulness Mama. (See her previous guest post.) Jennifer is a health nut – which explains what she’s doing here at Rogue Health. When she pitched me this post, she said it was a bit “parenty”, which it is, but it’s all good.

Unexpected Ways to Make the Most of Your Time

When you’re a parent, the amount of free time you have is pretty much non-existent. After all, you’re doing cooking, cleaning and laundry for more people – and the smaller that extra human is, the messier they tend to be!

You’re also on high alert pretty much round the clock, so even small tasks you used to do without thinking take at least twice as long because you’re constantly being interrupted – or at the very least, your mind isn’t fully on the job.

Five Ways to Get a Little Extra Time

This means your leisure time takes a big hit, and that could turn you into an extremely miserable person to be around. Instead of embracing martyrdom and turning into a monster, try these tips for getting a little more out of your day.

Just a little extra efficiency here and there can add up to a glorious couple hours of free time on the weekend – and maybe a little each day – if you play your cards right. Here’s how:
1. Turn Tasks Into Togetherness Time

Whether you see your kids all day or they have started school and won’t be home until mid-afternoon, you can still kill two birds with one stone in the time you spend with them. Once a day(ish), declare that it’s time to do a chore together – emptying the dishwasher, folding laundry, sweeping the floor, whatever. The job goes faster with help as long as you pick something age-appropriate, and you set the expectation that families pitch in together.

You can also have more in-depth conversations that you might think – working side by side somehow frees older kids up to start talking about things they’d never bring up at the dinner table.

2. Limit Your Screen Time

For real, it’s time to talk about what a time suck Facebook is. It’s so tricky to get a handle on just how many minutes – or hours! – per day you waste on social media because you probably open up those apps for just a few minutes at a time. Maybe you’re waiting for the microwave to finish, and then suddenly your food got cold because you got sucked into a political debate.

Instead, give yourself a specific time frame for internet browsing and social media during the day – maybe 30 minutes in the morning and 30 minutes at night. When you compartmentalize, you’ll use those distracting screen a lot less and have more free time for something you really love.

3. Maximize Your Time in the Car

Whether you commute to work or just spend a lot of time playing chauffeur for your kids each afternoon, the time you spend behind the wheel – or worse, stuck in traffic – can seriously cut into your enjoyment of life. Try using that time to your advantage with some great apps that let you listen to your favorite book, learn a new language or even meditate – all hands free!

You can also record your daily to-do list or make phone calls with your Bluetooth to take care of little things while you’re stuck on the road.
4. **ABC: Always Be Carrying ... a Book!**

You never know when you’re going to be stuck waiting in line for longer than you expected, so it’s a good idea to toss a book into your bag so you can pass the time productively. You can leverage this otherwise annoying time to enjoy yourself for a bit, or you can focus on learning a new skill.

Carry a journal instead, and you can get creative by writing your own material while you wait. Maximizing your time also means stealing some moments back for yourself, and this is easier to do when you pack appropriately.

5. **Learn to Say No to Things That Don’t Bring You Joy**

If you’re feeling over-booked with committees and volunteer work in addition to everything else you do for your family, it’s time to start cutting back. You de-clutter your home to get rid of things you no longer need, right? You can also de-clutter your life to clear your schedule of activities and commitments that are making you crazy instead of fulfilled.

You only need to ask yourself one simple question to know if a new activity is something you should say yes to: Would you be glad to clear your Saturday to do it, right now? If not, it’s probably not worth adding to your schedule. Avoid a difficult conversation by emailing your polite regrets, and refuse to feel guilt by saying you’re going to spend time with your family instead — then do it!

By finding extra time in your day with just a few of these tips, you can breathe a little easier because you won’t be breathlessly running from task to task. Enjoy your extra time by doing something for yourself — even if it’s just a quick trip to the gym! — or by spending a relaxing afternoon with your family. You’ve definitely earned it!

**PS:** If you liked this article or my website in general, check out my books, *Dumping Iron*, *Muscle Up*, and *Stop the Clock*.

**PPS:** You can support this site by purchasing through my [Supplements Buying Guide for Men](#).
Big Animals Die Younger

A recurring theme in research on aging is that of growth vs longevity. In essence, they’re opposed: more growth means shorter life, and less growth means longer life. The activation of physiological mechanisms in growth promotes aging, and deactivating them promotes longevity. Big animals die younger.

Evidence in non-human animals

Between species, larger animals tend to live longer. Elephants live longer than mice, who live longer than flies and worms. Mikhail Blagosklonny, the noted scientist who studies aging, sums it up as “Big mice die young but large animals live longer”.

As the article says, within species, larger animals die younger. Small mice live longer than big mice, because they grow less.

Why do larger animals, between species, live longer? Larger animals have fewer predators and low rates of accidental death; therefore, natural selection has worked on them to evolve longer lives, with more robust anti-aging mechanisms. In contrast, if the average mouse is dead at two years of age from predation or other accidents of life, then there’s nothing for natural selection to work on.

Calorie restriction is the most robust life-extension intervention known to science. Animals live longer when their food is restricted. The causes of this are hotly debated, but one theory is that since food promotes growth, restricting food hinders growth and extends life. Even when animals are fully grown, food activates the growth mechanism and effectively shortens life.
Evidence in humans

There’s a lot of evidence that larger humans die younger.

Obesity by definition means higher than normal body fat and thus higher body weight. The adverse health effects of obesity are well known.

Even when body fat remains the same, however, larger size appears to mean shorter life.

Among professional baseball players, larger size was strongly correlated to a lower age at death. See graph below.

![Graph](image)

Fig. 1. Decrease in average life span of baseball players with increasing absolute body weight.

Note that BMI for all the baseball players is quite similar, so age at death was not related to being overweight, but to total body weight and height. Taller players died younger.

Among different ethnic groups in California, death rates correspond to their
average body mass index, in order from lowest to highest: Asian Indian, Chinese, Japanese, Hispanic, White, African-American. (Hispanics actually weight the most of these groups, evidence for the Hispanic health paradox.)

Among Olympic athletes, those who set records at younger ages died younger. “Early and extraordinary peaks in physical performance come with a longevity cost”.

Life history theory postulates a trade-off between development and maintenance. This trade-off is observed when comparing life histories of different animal species. In humans, however, it is debated if variation in longevity is explained by differences in developmental traits. Observational studies found a trade-off between early and high fecundity and longevity in women. Development encompasses more than fecundity and also concerns growth and physical performance. Here, we show a life history trade-off between early and above average physical performance and longevity in male Olympic athletes. Athletes who peaked at an earlier age showed 17-percent increased mortality rates and athletes who ranked higher showed 11-percent increased mortality rates. Male athletes who had both an early and extraordinary peak performance suffered a 4.7-year longevity cost. This is the first time a life history trade-off between physical performance and longevity has been found in humans. This finding deepens our understanding of early developmental influences on the variation of longevity in humans.

The authors say, “It is important to note that cocaine was available since the first Olympic games and could have played a role in the association.” I’ve never heard before of Olympic athletes using cocaine, but that would certainly shorten lives. I suppose it’s completely unknown how many athletes used it.

Basketball players, who are of course much taller than average, don’t seem to live very long. Anecdotally,

Within the past year, the NBA has seen a spate of deaths among some of its notable retired big men – among them Moses Malone, Darryl Dawkins and Anthony Mason, none older than 60.

And now Larry Bird admits, he doesn’t expect to live to a ripe old age.

Another piece of evidence: women live longer than men, and women are smaller.

Kitavans, Okinawans, and Cretans

The people of Kitava, Okinawa, and Crete are famous for better health and
longer lives. Their diets and lifestyles have been extensively studied and have given rise to concepts like the Mediterranean and Okinawan diets, the Blue Zones, and the importance of religion and social ties for health and longevity.

What seems to have escaped many researchers is that these people are all small.

Kitavans show no evidence of heart disease or strokes and cancer appears to be rare. Young Kitavan men average 125 lbs (57 kg), and Kitavan men over the age of 60 average 107 lbs (49 kg). Kitavan women are also small. By the way, 80% of Kitavans smoke, yet appear to be in excellent health.

Okinawa has a high number of centenarians. The average male Okinawan centenarian weighs 97 lbs (44 kg); the average female centenarian weighs 81 lbs (36.7 kg). (ibid.)

The average man in Crete has a BMI of 22.8, the lowest of any surrounding Mediterranean communities, and they have the lowest death rate. “Cretans have 1/2 the all-cause and <1/20 coronary heart disease (CHD) mortality of larger northern Europeans.” (ibid.)

If size has such a large correlation to death rate, it makes me wonder how important the diets or other lifestyle factors of these people are. Maybe we’ve been looking at the wrong things, and all along it’s been their size that’s the most important. Of course, their diets affect how large they grow too.

Centenarians

Centenarians are on average short. In a group of Italian centenarians, average height was 156 cm, or 5’1.4″. “Mean values for height and weight of nonagenarians and centenarians were at the lower percentile values of the distributions reported for elderly American and European subjects...” Height was calculated using a formula based on knee height, so that spinal shrinkage did not influence results.

Okinawan centenarians are of “short stature”. In another group of centenarians, women were on average 2.5 cm (1 inch) shorter than controls, but men were not shorter.

It also appears to be trivially easy to find examples of long-lived short people. For example, just the other day the NY Times ran an article about Robert Marchand, the now-celebrated 105-year-old Frenchman who keeps breaking cycling records. It turns out that M. Marchand is 5’0” tall, and weighs 115 lbs. Salustiano Sanchez, who once held the rank of world’s oldest man, and who died at age 112, was nicknamed “Shorty”.

Why?

So, there seems to be good evidence, both human and animal, that larger
and/or taller humans and animals have shorter lives. Noted aging researcher Luigi Fontana has calculated that “risks of developing type 2 diabetes, cardiovascular disease, and several types of cancer” are lowest at a BMI of 21 to 22, and rise from there.

Why is there an inverse relation between growth and longevity?

One answer centers on mTOR, the cellular growth controller. When mTOR is activated after maturity, physiological reactions occur that promote aging. This is the “quasi-programmed” theory of aging. mTOR is necessary for growth and development, but continues in a mindless loop afterwards, accelerating aging.

Interventions that inhibit constitutive activation of mTOR are either good for health or extend lifespan:

- resveratrol
- rapamycin
- lower iron levels
- calorie restriction
- intermittent fasting
- curcumin
- metformin and berberine.

Interventions and conditions that promote mTOR constitutive activation are detrimental to longevity:

- obesity
- growth hormone supplementation. Acromegaly, or excess growth hormone, results in a 2 to 3-fold higher death rate.
- anabolic steroids
- insulin resistance.

However, an attribute like height is under strong genetic control, so it’s safe to say that genes have a lot to do with the growth vs longevity effect.

On the other hand, heights have increased over the past two centuries. Italian conscripts increased in height by about 5 inches from 1854 to 1963, and current rates of height increase are from 10 to 30 mm a decade. That increase must be environmental, and could be due to better nutrition and fewer childhood diseases.

**What to do about it**

You can’t control your height, so what can you do about this association?

1. Stay lean with a good, muscular body composition and low body fat.
2. Use some of the interventions listed above, such as resveratrol, intermittent fasting, and dumping iron.

That’s about it. Having good body composition will ensure that you don’t have insulin resistance. Essentially, all of these things go together: insulin
sensitivity, normal rhythms of autophagy, and good body composition. mTOR inhibits autophagy, the cellular self-cleansing process which is so critical to aging.

Beyond that, anti-aging treatments that inhibit mTOR are underway. You can already get metformin if you find the right doctor, although OTC berberine might be as good. Rapamycin is a promising anti-aging drug that’s being extensively studied, although it has its downsides. It seems possible that pulse dosing of rapamycin, perhaps once weekly, could have anti-aging effects without many of the downsides. Mikhail Blagosklonny believes that “rapamycin will become the cornerstone of anti-aging therapy in our life time”.

PS: Check out my books, Dumping Iron, Muscle Up, and Stop the Clock.

PPS: Check out my Supplements Buying Guide for Men.

Best Protein Supplements – and the Worst

As part of some research I’m doing for another project, I looked into protein supplements. For myself, I’ve always confined my choice of protein supplement to the best ones, and haven’t looked around a lot in general. I also asked some of Twitter peeps if they’d recommend candidates for the worst protein supplements. While this post is not meant to be a comprehensive guide, here’s a quick tour d’horizon of the best and worst protein supplements. I confined myself to ten of them. Here are the best protein supplements – and the worst.
Best Protein Supplements

These are not in any particular order.

1. **Immunocal**. This whey protein supplement is clinically proven to raise glutathione, and therefore it’s good for people suffering from an illness that increases oxidative stress. (Most of them do.) Immunocal is non-denatured and unflavored. Downside is that it’s quite expensive. While if I were ill I’d be happy to spend the money on it, this product is more than what athletes and bodybuilders need; they can use a less expensive product without loss of effect.

2. **NutraBio Whey Protein Concentrate**. I’ve long recommended this protein. Cold-processed, non-denatured, moderately priced. NutraBio has both flavored and unflavored types. The flavored contain artificial flavors and sweeteners, so avoid those if you’re concerned about them.

3. **Bulk Supplements Whey Protein**. Unflavored, great quality, and inexpensive. This may be the best protein supplement for the money, at 20 bucks for a kilo.

4. **MyProtein IsoPro 97**. This one gets high marks for purity and quality, according to my research. Probably a bit harder to find, but it’s available at Amazon.

5. **Optimum Nutrition Gold Standard 100% Whey Protein Powder**. This may be among the best of the big-selling brands. Artificially flavored/sweetened.

6. **Vega Sport Protein**. I doubt if I have many vegans in my audience, but if you want a vegan protein option, here it is. The protein comes from pea, pumpkin, organic sunflower seed, and alfalfa. There’s some interesting research that plant proteins can be as effective for muscle growth as animal-based protein if you get enough, or possibly more. This one has 30 g a serving, so it would likely do the job.

Worst Protein Supplements

Again, in no particular order.


2. **Optimum Serious Mass**. While two scoops has 50 grams of protein, it also has 1250 calories, maybe half of what a normally active, moderately sized man needs. This might be good if you’re a malnourished ICU patient, but even then there must be better choices. The mass you gain is likely to be fat. First ingredient is maltodextrin. Mass gainers make a lousy choice as a protein supplement.

3. **Odwalla Vanilla Protein Drink**. Hipster protein. First two ingredients, soy milk and sugar. Enough said. A whopping 43 grams of sugar, or about 10 teaspoons. 370 calories. Good Lord, where do they come up with this stuff?
4. **Gatorade Whey Protein Recover Bar.** 360 calories.

Look at the garbage ingredients: sugar, vegetable oil, nonfat dry milk, etc. Avoid. And avoid protein bars generally, even if you need the protein, although there may be a few good ones – I don’t know, I never eat them.

There must be thousands of protein supplements out there. If you want to supplement protein, you should look for a short list of ingredients with few of them artificial. For those seeking the highest purity, unflavored is best. Chocolate and other flavors are usually artificial, as are sweeteners. Others may contain vegetable oils, sugar, and unpronounceable artificial ingredients.

By the way, what do you eat for protein if you’re on the go and want something quick, but without the lousy ingredients in protein bars? Keep a supply of hard-boiled eggs in your fridge. They’re 8 grams protein each, have lots of healthy fats, and are low calorie. Perfect.

This list is far from comprehensive and is just meant as a quick view of protein supplements. If readers have suggestions or, God forbid, criticism, I’d be happy to hear them.

**PS:** Check out my books, *Dumping Iron, Muscle Up,* and *Stop the Clock.*

**PPS:** You can support this site by purchasing through my Supplements Buying Guide for Men.
Major Bacterial Involvement in Rheumatoid Arthritis

In a couple of recent articles, we saw that bacteria and iron are accelerants and likely causes of aging, and that the resultant hypercoagulation can be targeted. Etherisia Pretorius (a South African as the name implies) and Douglas Kell (British), two of the authors of the papers which went into those articles, along with colleagues, have recently written about major bacterial involvement in rheumatoid arthritis. This paper is worth bringing to your attention for a couple of reasons at least: 1) it suggests new ways to treat this condition, which is notoriously progressive and refractory to treatment; 2) it shows the involvement of iron.

What rheumatoid arthritis is

Rheumatoid arthritis (RA) is an autoimmune disorder characterized by inflammation, and while it most notably affects the joints, it can damage many other parts of the body. Signs and symptoms include:

- Tender, warm, swollen joints
- Joint stiffness that is usually worse in the mornings and after inactivity
- Fatigue, fever and weight loss

RA affects up to 1% of the population, and is about 3 times as common in women as in men.

The authors of this paper write:

We discuss how the exposure of genetically susceptible individuals to environmental factors (1) that can act as triggers (2), cause an
immunological reaction, followed by an autoimmune response (3), can result in RA (4). We review a plethora of evidence, collectively referred to as Ebringer's theory (5), that points to the environmental trigger as microbial (particularly from e.g. urinary tract infections) (6). We then look at the role of LPS from these microbes (7) in causing an imbalance between pro- and anti-inflammatory cytokines, followed by systemic inflammation, and the effect on the cardiovascular and hematological health of the RA patient (8) (see Figure 1). Finally, recognizing the lack of easy and accessible biomarkers, we suggest that in a truly precision medicine approach, hypercoagulability and also microparticle presence, as well as LPS and β-amyloid analysis could play an important role in tracking the progression of the disease.

**Bacteria and iron**

A high fraction of those with RA had an infection before diagnosis. One reason that women may have a higher rate of RA is because they have a higher rate of urinary tract infections, especially from the bacteria *Proteus*.

Once infected, antibodies formed against the bacteria can cross-react with human antigens, such as in joints, and cause inflammatory reactions.

How do these bacteria get inside the body? As we’ve previously discussed, body sites that are normally considered sterile, such as the blood, may have quite a lot of bacteria in them.

These bacteria come from the normal flora of the oral cavity and the gut, as well as from infections. Periodontitis is significantly associated with RA, and gut dysbiosis is frequently found in RA patients. Cardiovascular complications are also common in RA.

One of the keys here is that iron dysregulation allows the bacteria to grow.

We all get some bacteria inside us regularly, but the body’s natural immunity prevents them from growing and reproducing. One of the most important aspects of this natural immunity is iron withholding. Bacteria require iron to grow, as do all living things, and the body tightly holds on to iron to keep bacteria from procuring it for their own uses. Iron is at the center of an evolutionary arms race between animals and microorganisms.

In iron dysregulation, iron escapes from the proteins that hold it, mainly ferritin and transferrin. The free iron is then available for bacteria to use.

An important point is that the more iron in storage, that is, in ferritin, the more there is available to escape and become free iron. Lower body iron stores can mitigate this. This is shown by the fact that in hemochromatosis, or iron hereditary overload, physiological damage occurs, despite the fact that most of the iron is bound by ferritin.
In RA, iron dysregulation and bacterial growth cause hypercoagulation and other damage.

So, would dumping iron via phlebotomy (bloodletting) help treat RA? I couldn’t find a reference to the effect that it’s been tried. But hemochromatosis can masquerade as RA, and iron is found in the joints in RA and other joint diseases.

I’m guessing that someone with RA would not be allowed to donate blood, however. Therapeutic phlebotomy, under a doctor’s care, could be an option.

In addition, attention to gut issues and/or periodontal disease should be of benefit.

**Conclusion**

Rheumatoid arthritis, a potentially crippling and painful disease, has no known cause. But bacteria are definitely involved, and they are spurred on by excess and free iron.

PS: Check out my book, [Dumping Iron](#), which explains much more about the connection of iron to disease.

PPS: [You can support this site by purchasing through my Supplements Buying Guide for Men.](#)

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**Belly Fat Promotes Aging**

Not all body fat is created equal. Fat that accumulates beneath the skin, subcutaneous fat, is much less harmful to health — conceivably not harmful at all — than fat around the midsection — belly fat, abdominal fat, or the term
of art among scientists, visceral fat. And this belly fat promotes aging.

Visceral fat refers to body fat that is stored inside the abdominal cavity, around the internal organs (viscera), and it has uniquely harmful effects on health. For example, in older women, the ratio of waist to hip circumference is “strongly and positively associated with mortality in a dose-response manner”, and is a better marker of mortality and health risks than body mass index.

**Visceral fat is a significant risk factor for breast cancer in women**, and **for prostate cancer in men**. Visceral fat is **a strong predictor of heart disease in men**. The likely source for all of these risks is that **visceral fat promotes insulin resistance and ultimately diabetes**.

The health risks of visceral fat are well-known.

**Visceral fat and aging**

Insulin resistance, diabetes, and abdominal obesity together make up probably the most pro-aging formula around, as I discussed in my book *Stop the Clock*.

A common feature of life-extension interventions is that they decrease visceral fat. **Calorie restriction**, for example, the most potent life-extension procedure known, results in much lower levels of visceral fat. How important is this reduction to the effects of calorie restriction? Does reduction of visceral fat alone extend lifespan?

When animals have visceral fat surgically removed, **they live longer**. While they didn’t live as long as calorie-restricted animals, they lived longer than ad lib fed animals, showing that reduction of visceral fat could be an important component of calorie restriction and its anti-aging effects.

Indeed, some scientists believe that **reduction of visceral fat is the main reason that calorie restriction extends lifespan**.

Removal or reduction of visceral fat **improves insulin sensitivity**.

Until relatively recently, fat was thought to be just an inert storage material. It’s now known that fat produces hormones and cytokines, and that these play an important role in health. Increased visceral fat disrupts metabolism and increases health risks through these hormones and cytokines.

Methionine restriction also greatly extends lifespan. This intervention restricts the amount of only one amino acid, methionine, and this alone is enough to improve health and extend life.

Why methionine restriction does this has been the subject of a great deal of research and speculation. But a striking feature of methionine-restricted animals is that **they have much less visceral fat**. This is not due to eating less food, but to methionine restriction alone. The reduction in fat leads to insulin sensitivity on a par with young animals.
Bariatric surgery

Bariatric surgery is performed on obese patients for weight loss. There are various forms this surgery takes, but they have in common a decrease in the amount of food energy either ingested or absorbed.

All forms of bariatric surgery that cause weight loss improve insulin sensitivity and in many cases cure diabetes. Does loss of fat or eating less cause the health benefits?

Curiously, insulin sensitivity increases within days of bariatric surgery, before any appreciable weight loss has occurred. What in the world is going on? Insulin sensitivity improves while these patients are still morbidly obese and without having lost much weight.

Two things, both related, are probably going on here.

One is that bariatric surgery, especially in the few days immediately post-surgery, amounts to a medically enforced fast. With patients unable to consume much energy, insulin drops, as it does with intermittent fasting.

Another is that the direction of energy flow, whether into or out of fat mass, matters. If someone takes in little food, then lipolysis occurs, and fat starts leaving adipose tissue to provide energy.

Both visceral fat mass and calorie intake matter.

How to lose visceral fat

Given the enormous health consequences of visceral fat, keeping it minimal is crucial. Here’s how you do that.

1. Drop the sugar

Sugar appears to be just about the worst thing you can ingest this side of poisonous mushrooms or liters of whisky. It’s implicated in obesity, diabetes, and heart disease. It’s likely a risk factor for colon cancer and pancreatic cancer, to name two.

Importantly for our purposes, sugar is associated with increased visceral fat. The following graph shows what happened to people who drank a liter of soda a day for 6 months, vs a liter of milk, diet soda, or water. Liver fat went up 130%. That’s very bad for your health.
2. Cut the carbohydrates

Low-carbohydrate diets are better for weight loss than “healthy eating”.

Cutting carbs means avoidance of anything made with grains: breakfast cereal, bread, pasta, rice, etc. It also means avoiding starch, such as potatoes.

3. Intermittent fasting

Intermittent fasting may be just as effective as calorie restriction at fighting aging. Fasting for 16 hours or more lowers insulin, which leads to increased lipolysis, or breakdown of body fat.

4. Lift weights and/or do high-intensity exercise

High-intensity exercise, but not low-intensity, decreases visceral fat. Twice-weekly resistance training decreases abdominal fat and improves insulin sensitivity.

Conclusion

Visceral fat is responsible for most if not all of the deleterious health effects of obesity. It shortens lifespan and is potently pro-aging, leading to increased risks of heart disease, cancer, and diabetes.

To avoid it or get rid of it, you should do the opposite of what most people are doing.

PS: To see why lifting weights is important for your health and how to do it, read my book Muscle Up.
Atrial Fibrillation and Iron

Atrial fibrillation is an irregular heart beat that involves the fluttering of the heart’s upper chambers (atria). It can lead to blood clots, stroke, and heart failure. Several million Americans have it, and it’s more common in older people. Could there be a link between atrial fibrillation and iron?

There certainly could. Consider a report from 2010: Remission of paroxysmal atrial fibrillation with iron reduction in haemophilia A. (If interested, the full paper can be accessed at Sci-Hub.)

Two male cousins, one age 49, the other 57, both with hemophilia, developed atrial fibrillation. They both refused a procedure to reduce or eliminate their arrhythmia due to concerns about bleeding. The effectiveness of drugs was wearing off.

So a course of iron reduction via phlebotomy was decided on.

Major point I want to emphasize: one of the men had a ferritin of 389 ng/ml, the other 305. The Mayo Clinic says that a normal ferritin level for men is 24 to 336 ng/ml. So, one of the men was somewhat above the normal range, the other was within it.

While it’s well known that people with hemochromatosis – pathological iron loading, in which ferritin levels sometimes reach over 1000 or more – are at higher risk of cardiac arrhythmias, these men did not have hemochromatosis. One of these men had a normal ferritin level, the other only somewhat high.
The first patient had 6 units of blood removed over 6 months time — his atrial fibrillation stopped when his ferritin was 68. Doctors brought the second patient down to a ferritin of 29. His atrial fib also stopped.

The patients had periodic phlebotomy over several years time to keep ferritin at a low level.

Is it possible that iron is involved in other cases of atrial fibrillation?

Consider that many guinea pigs that are iron-loaded die of sudden cardiac death, “presumably from cardiac arrhythmias”. Granted that these animals must have had very high iron levels.

How would iron do this? In a word — or two words — oxidative stress. Iron is a reactive metal that causes oxidation. It builds up in myocardial cells of the heart and damages electrical conduction.

Some natural methods of dealing with atrial fibrillation also seem to work through reduction of oxidative stress: vitamin C, and n-acetylcysteine.

While atrial fibrillation seems to have a number of causes, and is generally poorly controlled by drugs, oxidative stress and inflammation are thought to play a role.

**Conclusion**

Keeping iron levels in a low normal range, or at least preventing them from rising too high, could have an impact on whether someone gets atrial fibrillation.

From the case study I discussed, it doesn’t appear that iron levels even need to be all that high to result in atrial fibrillation. Of course, other factors are involved, and not everyone with iron levels in that range gets atrial fib.

**PS:** See my book [Dumping Iron](#) for more.

**PPS:** You can support this site by purchasing through my [Supplements Buying Guide for Men](#). No extra cost to you.

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Aging Starts Young

Answering the question “what is aging?” is essential to having the ability to do something about it. As we’ll see, we do know a great deal of the answer, and this leads to the conclusion that aging starts young.

Perhaps the earliest indication of aging is muscle loss. As we age, we lose muscle to the extent that by the age of 80, the average 80-year-old man will have lost half of his muscle. But this decrease in muscle starts early, and can be detected as early as when someone is in his thirties.

Aging includes not only loss of muscle, but a decline in the functions of the brain and nervous system, immune function, hormones, bone loss, and others.

One way to detect the beginnings of the decline in these functions would be to use a test capable of fine discrimination between people, since the deterioration of aging isn’t noticeable to the naked eye or even a thorough physical examination.

We do have such a finely discriminatory test: athletics.

The following chart shows the winners of men’s championship track and field events by age, and was put together by Erwin Schmidt using data from Wikipedia.
The chart shows that the number of gold medalists peaks at age 23 or 24. (Small sample size means that the number of medalists at age 24 could be a fluke.)

The number of medalists at ages 19 to 21 is small, perhaps because men that age have not reached a peak of development and are still adding muscle to their frames. It could also be due to more and harder training as they reach age 19 and begin to ramp up for a world-class battle.

At age 23 (or 24), the number of medalists peaks. Afterwards we see a steady decline, until at ages 30 to 33, only one runner of each age won a gold medal. There are no gold medalists above the age of 33. By the age of 34, all championship runners have aged enough so that they’re not competitive at the world-class level.

Sprinting and short-distance running seem ideal for this sort of determination. In sprinting, intensity of effort is key, and all physiological systems must be in peak form and able to deliver 100% performance.

Sprinting also requires less skill (dexterity) than other sports, so we don’t confound the acquisition of skills as a person ages with physiological condition. And of course, skill is also a determinant in team sports, and sprinting is a solo sport.
Aging is damage

Aging means the accumulation of damage to tissues, cells, their organelles, and their constituent molecules (proteins and lipids).

Damage occurs at any age, but when an organism is young, it has full ability to clear and repair the damage.

Very likely, an important way that an organism clears damage is through dilution of the damage. When an organism grows, cells divide, and any damage present in one cell becomes diluted in the daughter cells, so that each cell has less damage overall.

We can see – or imagine – this process in the chart of the gold medalists above. The runners are still growing until the age of 23, which accounts for the smaller numbers of medalists at ages 19 to 22.

After the runners have reached maximum growth, then aging begins, and the number of medalists at each age declines. That’s what I speculate anyway.

But whatever the mechanism, it’s clear that aging starts young.

Fighting aging

While all body systems decline in aging, one of the earliest seen is the decrease in muscle mass and/or muscle power, and this probably (in my opinion) drives the decline in numbers of gold medal winners in track by age.

It follows that strength training, starting at an early age, could help stave off the earliest manifestations of aging. For instance, I now have more muscle mass in my sixties than I did at age 30. So I’ve covered at least that aspect of aging.

The decline in muscle mass and strength in the runners must be minuscule at those ages, but may be enough to affect the outcome of a world-class athletic event.

PS: For more on keeping and building muscle, read my book Muscle Up, and for more on fighting aging, read my book Stop the Clock.

PPS: You can support this site by purchasing through my Supplements Buying Guide for Men. No extra cost to you.

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Multi-Supplement Abolishes Brain Cell Loss

A scientist named C. D. Rollo has done extensive work on the ability of a complex supplement to combat aging. He uses a strain of transgenic mice that have high levels of growth hormone and IGF-1, which promote aging. Previously, Rollo and his team found that this complex, multi-supplement extended their lifespan by 28%, and even extended the lifespan of normal, wild-type mice by 11%. A more recent study found that this multi-supplement abolishes brain cell loss in these animals.

The ingredients of the multi-supplement are as follows:
In a just published study, his team used the same transgenic mouse model to study the loss of brain cells, an important malady of aging that leads to dementia, Alzheimer’s disease, and Parkinson’s disease, or in milder cases, cognitive impairment. (1)

These mice experience severe cognitive decline, losing greater than half the cells in the mid-brain region, the equivalent of a human case of Alzheimer’s.

They report that the multi-supplement completely abolishes the loss of brain cells in these mice, reverses cognitive decline, and increases sensory and motor function. Photoreceptor cells in the eyes were also increased.

The researchers comment, “We know of no other treatment with such efficacy, highlighting the potential for prevention or amelioration of human neuropathologies that are similarly associated with oxidative stress,

### Ingredients included in the complex dietary supplement

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mouse dose (mg/day/100 mice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin B1</td>
<td>30.5</td>
</tr>
<tr>
<td>Vitamin B3 (nicotin)</td>
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<tr>
<td>Vitamin B6</td>
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<tr>
<td>Vitamin B12</td>
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<td>Vitamin C</td>
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<td>Vitamin D</td>
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<td>Acetyl-L-carnitine</td>
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<tr>
<td>Alpha-lipoic acid</td>
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<tr>
<td>Acetylsalicylic acid</td>
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<td>Beta-carotene</td>
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<td>Bioflavonoids</td>
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<td>Chromium picolinate</td>
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<td>Folic acid</td>
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<td>Ganitc</td>
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<td>Ginger root extract</td>
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<td>Gingko biloba</td>
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<td>Ginseng</td>
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<tr>
<td>Green tea extract</td>
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<tr>
<td>l-Glutathione</td>
<td>30.5</td>
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<tr>
<td>Magnesium</td>
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<td>Manganese</td>
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<td>Melatonia</td>
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<tr>
<td>N-Acetyl cysteine</td>
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<tr>
<td>Potassium</td>
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<td>Rutin</td>
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<td>Cod liver oil (omega 3)</td>
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</tr>
<tr>
<td>Coenzyme Q10</td>
<td>00.0</td>
</tr>
<tr>
<td>Flax seed oil</td>
<td>1,210.5</td>
</tr>
</tbody>
</table>
inflammation and cellular dysfunction.” [My emphasis.]

So, what’s going on here?

Excess growth hormone and/or insulin-like growth factor (IGF-1) promote aging, and lead to oxidative stress, mitochondrial dysfunction, inflammation, and insulin resistance. These conditions then lead to the loss of brain cells.

The ingredients in the complex supplement alleviate these conditions and prevent the death of brain cells.

N-acetylcysteine and alpha lipoic acid increase glutathione, the body’s most important internal antioxidant.

Green tea extract promotes autophagy, the cellular self-cleansing process that gets rid of junk molecules that have passed their expiration date.

Acetylsalicylic acid (ASA): this is aspirin, currently one of the most effective anti-aging drugs known.

Omega-3 fatty acids, which are found in fish oil and are very important for health, decrease inflammation.

The list goes on, but the important point is that these ingredients can protect against many of the ravages of aging. It would be difficult if not impossible to obtain the amounts of these substances in the supplement through diet alone.

PS: Check out my Supplements Buying Guide for Men.
Antidepressants Are Placebos

Do antidepressants actually work to treat depression? They do have some effect, although in most studies the effect is barely distinguishable from the placebo control.

Irving Kirsch, a psychiatry professor in the UK, first discovered this through his interest in the placebo effect. His recent article, Antidepressants and the Placebo Effect(1), explains. The following are the most important points:

- clinical trials show little difference between placebo and drug
- any difference at all could be due to an enhanced placebo effect, since almost always both patients and doctors become “unblinded” – they guess that they’re getting real medicine
- in trials without placebo controls, antidepressants have greater efficacy, since patients know they’re getting a real drug – an enhanced placebo effect
- whether the drug raises serotonin, lowers it, or doesn’t affect it at all, the antidepressant efficacy is always about the same
- therefore, the serotonin theory of depression “is as close as any theory in the history of science to having been proved wrong”
- it follows that doctors should quit prescribing antidepressants and use therapies with no side effects, don’t depend on the placebo effect, and have been shown to work, namely psychotherapy and exercise.

The reason why both patients and doctors become “unblinded”, that is, they guess that they’re getting medicine, is because antidepressants have side effects, like insomnia and sexual dysfunction.

Kirsch remarks, “In the data sent to us by the FDA, only 43% of the trials showed a statistically significant benefit of drug over placebo. The remaining 57% were failed or negative trials.”

The FDA requires two clinical trials showing benefit before drug approval. But pharmaceutical companies are allowed to keep trying until they get two good trials, hence the negative trial’s don’t count.

Furthermore, Kirsch carefully distinguishes between statistical benefit and clinical benefit, and he says that in almost all cases, the minute statistical benefit would not be enough for doctors to notice or for actual benefit to the patient.

As in so many other cases, this is now all about money. Big Pharma isn’t about to let go of its cash cows, and it has enablers in the FDA and among bought-and-paid doctors and scientists.

If serotonin “imbalance” doesn’t cause depression, what does? Depression is an inflammatory disease. Anything that fights inflammation will fight depression: exercise, weight loss, low-carbohydrate diet, curcumin, etc.
PS: This post is shorter than usual. I have such a backlog of things that I want to write about, but I’m too busy to write thousand-word articles about them, so I may try a few of these shorter pieces.

PPS: Slightly related: check out the list of side effects of another psychoactive drug, Aricept, used to treat dementia.

<table>
<thead>
<tr>
<th>Common side effects of Aricept:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Chronic Trouble Sleeping</td>
<td>Severe</td>
</tr>
<tr>
<td>Cramps</td>
<td>Severe</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Severe</td>
</tr>
<tr>
<td>Feel Like Throwing Up</td>
<td>Severe</td>
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<tr>
<td>Throwing Up</td>
<td>Severe</td>
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</table>

<table>
<thead>
<tr>
<th>Infrequent side effects of Aricept:</th>
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<tbody>
<tr>
<td>Arthritis</td>
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<tr>
<td>Depression</td>
<td>Severe</td>
</tr>
<tr>
<td>Dizzy</td>
<td>Severe</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>Severe</td>
</tr>
<tr>
<td>Feeling Faint</td>
<td>Severe</td>
</tr>
<tr>
<td>Frequent Urination</td>
<td>Severe</td>
</tr>
<tr>
<td>Head Pain</td>
<td>Severe</td>
</tr>
<tr>
<td>Hemorrhage of Blood Under the Skin</td>
<td>Severe</td>
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<tr>
<td>Loss of Appetite</td>
<td>Severe</td>
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<tr>
<td>Low Energy</td>
<td>Severe</td>
</tr>
<tr>
<td>Nightmares</td>
<td>Severe</td>
</tr>
<tr>
<td>Pain</td>
<td>Severe</td>
</tr>
<tr>
<td>Weight Loss</td>
<td>Severe</td>
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</tbody>
</table>

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