The Tech CEO’s Unfair Advantage …

Do-It-Yourself Nanotech Super Nutrients
(5 to 20 times more potent than regular vitamins)

by Mark Joyner
Founder and CEO
Simpleology - Get it done. Faster.
www.simpleology.com

This report is free to all Simpleology users. If you would like to share it with your friends, please send them to www.simpleology.com/nano so they can set up a free account (and get even more bio-hacking and productivity-hacking goodness for free).
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How to Use This Guide

Bro #1: “Just take five, dude.”
Bro #2: “Five what? Five pills?”
Bro #1: “No, no. 5 grams.”
Bro #2: “Do you mean 5 micrograms?”
Bro #1: “Whichever.”

You have just witness “bro science” in action. It’s well-intended. It can also be deadly.

The difference between 5 grams and 5 micrograms, depending on the substance, can indeed be the difference between life and death.

Where should one get such information? From qualified sources, of course. Not from your bro. Want to know about proper dosage? Look in the medical literature and find out what dosages have been shown through experimentation to render the desired effects. Want to know about a proper manufacturing method? Then you need to read technical manuals written by actual engineers.

As much as possible, I’ve pointed you to more qualified sources of information than myself throughout this guide. I’ve deliberately left out information about dosages in order to force you to use this as a starting point rather than a definitive resource.

At the same time, I’m obviously encouraging DIY experimentation. Allow me to clear up the apparent contradiction.

See, I intend for this report to be, among other things, a bit of a shot across the bow of the troubled ship that is the nutritional supplement industry. Here’s a field that can do so much good but that exhibits so little true innovation. When anyone can private-label the same sub-standard supplements everyone else is selling and “win with better marketing,” it doesn’t seem there’s much incentive to raise the bar.
The best way to shake up such a market is to educate the buyers. When consumers are aware of better ways to ingest their nutrition, the supplement sellers have to respond - or go out of business. Life will be made even harder for them when they realize that consumers can make better supplements than they are selling right at home. Harder still when consumers are equipped to evaluate for themselves just how effective the supplements they take are. (More about all this later …)

Another way to shake up an industry is to introduce smarter and hungrier competitors. Loaded throughout this document are little entrepreneurial breadcrumbs for any who wish to follow them. Supplementation is but one of the many markets the biohacking revolution will make ripe for profit, you’ll also learn as you read on.

I hope more than a few millionaires and billionaires are made as a result.

More importantly, I hope many experience much greater health.

**Want to Meet Other Biohackers and Stay Up to Date with New Developments?**

Hang out in the comment section of the [original blog post](https://www.simpleology.com) for this guide. I hope to see you there.
A Serious Word of Caution

This is where you expect me to say “I'm not a doctor.” You expect me to say “don't follow this advice except under the advice of a qualified medical practitioner.” And you expect me to be saying all of this as a way to cover my own ass. You don’t expect me to mean it.

But I do. I really really do.

You’re about to get a glimpse into the crazy world of the biohacker. Should you follow this example? Perhaps the following will scare you enough to think twice ...

Silicon Valley programmers and executives, among whom one will find most of today’s biohackers, are some of the smartest people in the world doing some of the most intellectually challenging stuff in the world. It's a fact few would dispute. But we’re also doing some of the riskiest stuff in the world to give ourselves an edge.

For example, recreational and productivity enhancing drugs are quite common in this tech subculture. (See the companion guide “Reverse Engineering the Limitless Pill.”)

It’s not uncommon for biohackers to take an “ayahuasca vacation” in Peru for creative inspiration and soul searching. To smoke marijuana on less rare occasion to unwind. To take modafinil and other “smart drugs” on even less rare occasion to boost productivity during the weekdays.

How smart are they now?

What is “the valley?”

Historically “Silicon Valley” was the geographical Santa Clara valley, but the cultural borders are expanding as the digital renaissance rages on. Now some even consider the entire San Francisco peninsula all the way from the Marina down to the southern tip of San Jose to be the valley. Not all will agree on where these borders are drawn, but that the borders are expanding is indisputable. Yes, each region is still distinct. Each regional subculture is unique. But the region is quickly becoming a grand unified mega-metropolis in the style of New York and L.A. These borders will likely eventually include parts of the East Bay and North Bay areas as well. Many already consider Oakland to be San Francisco’s Brooklyn.

But before you dismiss the biohackers as “a bunch of crazy druggies” it’s important to recognize that they tend to be quite discerning about what they put in their bodies. They aren’t haphazardly popping any pill they find, but are instead popping pills for specific biological effects. They tend to understand the effects, and risks, of anything they ingest far more than the average casual
Further, meth, cocaine, heroin and the like are just as socially unacceptable to biohackers as they are everywhere else. Why? Because they have read the science and know precisely how destructive those substances are.

So, am I advocating drug use? Absolutely not. (Nor am I even advocating experimentation with any of the methods outlined here in this document.)

To the biohacker statements like “all drugs are bad” are simply inadequate and illogical.

Many biohackers commonly argue marijuana, for example, has a much lower risk profile than alcohol. They claim this opinion is extremely well supported by the actual medical literature, despite the cultural fatwa on pot in more socially conservative circles.

So puff away? I wouldn’t recommend it.

While its risk profile is indeed lower than alcohol, there are still those whose lives are destroyed by marijuana. In the same way that alcohol can be easily handled by one person, but destroy the life of another, marijuana can definitely ruin one’s life. We probably all know a friend or two who became irrevocably absent minded and lazy as a result of regular use.

Like alcohol, its effects depend on the person using it, their general health, the frequency of use, and a host of other circumstantial, biochemical, and environmental factors. But these effects are not completely understood, and therefore absolutely unpredictable.

And this brings me to the larger point at hand: the effects of these things are unpredictable yet still biohackers experiment with them. How smart are they now?

That last paragraph is worth a re-read.

While the subject of this report is not as socially taboo as that of recreational drugs, it can be as unpredictable. The alternative delivery mechanisms of nutrient absorption I outline here are indeed potentially quite dangerous.

Use any of them in the wrong way and they could be fatal.

Here’s an example. One of the delivery mechanisms I mention is the “transdermal” pathway of absorption. This simply means that the nutrients are absorbed through the skin. One of the solvents used for this is dimethylsulfoxide (DMSO). It’s commonly available, and also commonly used as an alternative medical treatment for arthritis and other types of joint pain.

It just so happens that it has a property whereby it binds with certain types of chemical and, if the
molecular weight of the chemicals is small enough, it will take these chemicals right into your bloodstream when rubbed on the skin. This property can be used to your benefit (in the case of B12, as some report) or to your detriment (if you accidentally get some mercury from a broken thermometer into your DMSO concoction, for example).

Mercury poisoning, my friends, can be fatal.

Did you read that? Fatal.

Don’t screw around. Do your own research and understand what you’re working with before you mess around with any of this stuff.
Your Promise to Me

Before you proceed, you need to make me a few promises.

1. You'll treat this report as a departure point, not a definitive resource. Do your own research before you begin your experimentation, if you begin at all.

2. You will talk to a qualified medical professional first - preferably a family doctor who knows you, and your history, well.

3. You will not use these methods as a patch against bad habits, but instead as part of a larger approach to general health and vitality. (Such as the simple approach outlined in The High Energy Habit.)

4. You will take responsibility for your own actions.

Deal?

OK, strap in.
The Other End of the Health Industry

“I suspect most of these pills are going right out the other end.”

My dad was right. He didn’t know how right.

We were taking these little packs of multivitamins as part of our evening ritual. After dinner we’d tear open the little plastic packets and choke down the contents - about 6 horse pills of various shapes and colors.

Knowing what I know now about the bioavailability (or lack thereof) of most vitamin pills, I don’t suspect those pills were doing much for us. Yet millions around the world take vitamin pills every day not really knowing what they are doing to their bodies.

Yes, some vitamin supplements are extremely effective in pill form. Yet many, most I suspect, aren’t providing much more than a placebo effect. In the worst cases, many are even harmful.

We’ve come a long way since the days of the sawdust tablets I choked down when I was a kid, but not long enough. Surprisingly, many utterly ineffective delivery methods are still on the market.

Thanks to the Internet it’s getting harder for nonsense to be pawned off on the unsuspecting public. The public? They suspect now. And they have a way to indulge those suspicions. This is weeding out those selling ineffective and dangerous products.

Every now and then it doesn’t hurt to aggressively hasten this process, though. Again, that’s part of what I’m hoping to accomplish here. The more folks know about these alternative delivery mechanisms, the more purveyors of nutritional supplements will need to step up their game. And the more common this knowledge, the easier the entry into this market. Ideally this will result in decreased costs and increased quality for everyone.

Who cares? Well, at the risk of sounding melodramatic … perhaps we all should.

I’m tempted to drop in some scary stats about rising rates of diabetes, obesity, and cancer … But you’ve heard it all before, and some argue that these statistics are more a factor of our aging population than anything else.

A strong argument could be made there for sure, but does it really matter? What matters to all but the most cynical is an increase in the quality and quantity of our lives. The health industry can deliver that far better than it has thus far.

My personal belief is that being aggressive about these things is not just a good idea but a matter
of survival for the more chemically sensitive among us. I'll address that in a later section, but first allow me to paint a potential future.

What if the best of the supplement, pharmaceutical, and biohacking industries could be woven together and all of the ugliness expelled?
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<td>Varies. Some sources have impeccable manufacturing practices</td>
<td>Must meet tightly monitored standards.</td>
<td>More often than not they must self-source from exotic or dangerous</td>
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What if one were able to have the best of all these worlds? What if one could benefit from the sophisticated delivery mechanisms of the pharmaceutical industry, but have the speed to market of the biohackers? And what if one could have the focus on prevention practiced by the biohacking community but with the high grade sourcing found in pharma?

That's what this guide hopes to make possible. This vision will only be possible through mass education. We need a more highly educated consumer so that the demand for higher standards in unignorable. And we need a more highly educated entrepreneur so he knows how to respond to this demand.

With that, we’re now ready to get into some specifics.
Liposomes

Liposomes are artificially manufactured lipid (fat) nano-capsules.

Imagine taking a vitamin capsule and shrinking it down to the size of a nanoparticle. Then, instead of a gelatin capsule you have a very delicate capsule made of a fat globule. This little fat capsule disguises the contents so well that it goes right into the bloodstream, totally bypassing all of the digestive complications present with traditional delivery mechanisms.

Many supplements get stuck somewhere in the digestive process and never enter your bloodstream at all. Many get stuck in the liver. Some don’t even make it past your stomach. Liposomes slip right on through each phase.

As I write this report, 11 pharmaceutical drugs use liposomal encapsulation as a delivery mechanism and several more are under the approval process. These drugs range from oral vaccines to antifungals to analgesics.

So, liposomes as a nanotech delivery mechanism for drugs is recognized by the traditional medical community. Using them as a delivery mechanism for nutrients, however, is not. This is probably due to the aforementioned (and most of the time justifiably) conservative nature of traditional medicine. The slow speed and high cost of the approval process is probably making such recognition impractical.

But this hasn’t stopped biohackers from experimenting with liposomal encapsulation to deliver vitamin supplements. From my examination of the science, I believe this is a really positive trend. Since liposomes are usually composed of lecithin and whatever it is you are encapsulating, they appear to be safe.

But this opinion does require two caveats … First, it depends on one’s opinion of the relative health merits of lecithin. Since GMO soy is a concern for many people (a concern I share), many use a lecithin made from GMO-free soy. There are other health concerns with soy (phytoestrogens, protease inhibitors, etc) that do not appear to be relevant to lecithin, but if one were to be extra safe they could use a sunflower lecithin rather than soy. (I use the organic sunflower lecithin made by Lekithos).

Next, liposomes theoretically could be formed around undesirable substances inadvertently. So, it would be wise to ensure the equipment you use is quite clean and sterile.

There are many methods for manufacturing liposomes, but most of them involve solvents or complex equipment to which the average person simply does not have access.

One method however, sonication, appears to be DIY-ready. Obscure underground elements of
the biohacking community have been sharing sonication recipes for a few years now. Frankly I’m quite surprised that it hasn’t garnered mainstream attention, or even wide attention in the sports nutrition, bodybuilding, or MMA communities.

The concept is quite simple. You dissolve lecithin in water, mix in whatever compound you want to encapsulate, blend it, and then “sonicate” it.

Sonication is the application of ultrasound waves to liquids to agitate particles. The effect this has on the lecithin mixture is to break the resulting liposomes into smaller and smaller sizes. Industrial sonication equipment is quite expensive, but clever biohackers are using inexpensive home jewelry cleaning devices as makeshift sonic encapsulators.

Some of the nutrients that are commonly ingested by liposomal nutrient experimenters are:

- glutathione
- vitamin C
- resveratrol
- curcumin

The exact methods employed for each substance may need slight adjustments. When encapsulating glutathione, for example, one would need to take care not to over-blend. Glutathione is a delicate peptide that is likely destroyed by intense blending.

Here’s a YouTube video of a guy making liposomal vitamin C at home.

Now, if the word of a random dude on YouTube isn’t enough for you (I sure hope it’s not), then you can check out this DIY Liposomal Encapsulation Technology Yahoo Group to interact with other experimenters.

If you are technically minded, you can then dive into some of the more serious research about liposomal encapsulation technology:

Liposomes: An Overview of the Manufacturing Techniques (Mozafari)

Liposome Preparation Methods (Riaz)

Nanoparticles in Medicine: Therapeutic Applications and Developments (Zhang, et. al.)
Nebulization

Nebulizers are an extremely efficient method of drug delivery whereby compounds are dissolved in liquids and then turned into a fine mist of nanoparticles. This mist is then inhaled and the compound is absorbed through the lungs. Absorption rates are extremely high.

Here is another case of a delivery mechanism that is used in medicine, but has not yet been fully explored in the field of nutrition. Nebulizers are commonly used in various treatments for asthma and many other respiratory illnesses. Nebulized nutrients however, are rarely seen in medicine. The science on it is mixed, but hopeful. It has been demonstrated that it can be an effective delivery mechanism for some nutrients (for example, vitamin B12) but in the case of nebulized glutathione, it was also shown to cause some complications in asthmatic patients.

Yet still nebulized glutathione is offered in some of the more adventurous alternative medical clinics and they claim great results (all undocumented, so far as I know).

I know of several people in the Valley who nebulize various substances, but I’m only mentioning glutathione here because its the only nutritional supplementation via nebulization I’ve seen in mass use and that I’ve experimented with myself.

Now a word of caution … Even greater care needs to be taken with this method. If the quality of the water you use is not absolutely pure (distilled) and if the quality of the nutrients you mix in is impure, you’ll be ingesting these impurities. Very efficiently, at that.

Further, experimenting with different nutrients via this method is reckless and could even be potentially fatal.

With that said, here is the protocol with which I have experimented. Check with a qualified medical professional before attempting this.

Some additional notes to would-be experimenters …

1. Acquire a Veridian Pediatric Nebulizer

Many nebulizers seem to be made from plastics containing bisphenol A (BPA). BPA is, in my opinion, an environmental toxin that should be taken quite seriously. (Take a Google trip some time on the health impact of BPA. It may convince you to eliminate it from your household.)

The pediatric nebulizers from Veridian are the only units I’ve found that definitively state they are BPA-free.
An ultrasonic nebulizer will get an even smaller particle size (1 to 5 microns), but glutathione nebulization is effective up to 10 microns which this unit supports, and I have not found a source for a BPA-free ultrasonic nebulizer anywhere. (If you find one, please share it on the blog post for this guide.)

2. Use a Pharmaceutical Grade Source of Pure Glutathione

Most glutathione pills sold at health food stores (which are a total waste of money, by the way) have fillers. You don’t want random fillers getting into your lungs.
Vaporization

E-cigarettes (electronic cigarettes) have taken the world by storm over the last few years. Given that nicotine, while addictive, is one of the least harmful substances produced by cigarettes, an alternative method for ingesting pure nicotine, especially one that closely mimics the experience and ritual of smoking, is a truly hopeful development.

E-cigarettes are essentially mini “vaporizers” - devices that combust solids and liquids to vapor by applying a precise amount of heat.

Most E-cigarettes work by adding pure nicotine (in precise doses) to a solvent - usually propylene glycol. Other substances can be combusted in this way as well. Indeed, many E-cigarette companies have advertised the addition of vitamins and medicinal herbs to their mixtures.

In the Valley, I’ve spoken to many who purchased their own digital vaporizers and then created their own concoctions by adding different vitamins to propylene glycol. This area, while quite promising, is another where I will omit some specifics and leave the reader to their own research.

There are many potential problems with this method. First, the long term effects of vaporizing propylene glycol and other solvents are almost completely unknown at this point. Next, applying heat can change the nature of any compound, and the change depends on the specific temperature. I haven’t found any reliable sources on the appropriate vaporization temperatures of vitamins in propylene glycol solution. So, do they work? It’s anyone’s guess …

A better known mechanism however, is the vaporization of herbal substances. Indeed, changing the vaporization temperature of various substances can release certain compounds while leaving others un-vaporized. (A little-known fact that has, for example, been used in the medical marijuana community to separate the analgesic effects of marijuana from the psychoactive. One might reflexively dismiss this notion until they consider the implications of widely-available, low-cost, non-addictive, pain killers. This is actually a potential tool for combating drug addiction - not creating it.)

This is still a relatively new area that doesn’t have nearly enough information to be reliable, but I know of a few people who regularly vaporize things like Gingko Biloba and other herbal medicines. (Haven’t tried it myself and haven’t seen enough information to be convinced it is safe or effective.)

If one were to experiment with this, they would need to acquire a vaporizer that has a very precise temperature control, they would need to know the specific temperature range to unlock the specific desired compound from the selected herb, and preferably they would have spoken to
a number of people who have experimented with the technique directly - and their doctor.

Random experimentation with this method would be quite foolish. Without knowing the precise effects, it could even be fatal.

All the same, this is a new delivery mechanism with promising potential.
Sublinguals

Another great way to bypass the digestive tract is the sublingual pathway. Some compounds, when in the proper form, mixed with the proper solvents, and in the proper particle size, can be absorbed directly into the bloodstream when placed under the tongue.

Sublinguals are commonly available in medicine and in nutrition, but the purity and potency of these store-bought sublinguals supplements are at times questionable. If you make them yourself you can know exactly what’s in them.

There are a great many ways to make nutrients available for sublingual delivery, and the method often depends on the compound you’re wanting to ingest. There is one general method, however, that is extremely versatile and commonly used for herbal supplements: tinctures.

Before I explain the method, it’s important to note that not all tinctures are effective sublingually. Sometimes part of the chemical composition of a tincture will be available sublingually and another part will only be available after you swallow it. And of course some components will be totally non-bioavailable. Knowing how a particular herb behaves as a tincture is essential to precise experimentation.

Tinctures have other benefits as well. Often the active ingredients in herbs are not available in high enough concentration in their natural form to make direct supplementation effective. Creating a tincture can allow you to load a much higher concentration of the active ingredients in a much more portable form.

Keep in mind that not all of the active ingredients may transfer over to your tincture. Before experimenting with random tinctures it’s extremely important to find out exactly what chemicals are being drawn out, if they are the ones required for the desired effect, what their bioavailability is in tincture form, and so on. Otherwise, you are performing a totally different type of experiment, and possibly a quite dangerous one.

The good news is that there are a great many tried and true tincture recipes that you can duplicate. Most of them are “tried and true in the world of alternative medicine” but not recognized by traditional medicine. So, use your own judgement here.

The general method is as follows:

1. Acquire a glass mason jar
2. Fill it with the desired herbal substance
3. Pour in high grade vodka (40% alcohol - 80 proof or higher is the general standard) until it
covers your herbs. *(Note that different grades of alcohol will produce different effects and draw out different volumes, and types, of compounds.)*

4. Let it sit in a dark place for at least a week or so, shaking it up once or twice a day.

5. The longer you let it sit, the higher the concentration.

6. When you choose to harvest it, pour the mixture over some cheesecloth or a strainer and place the liquid into small glass dropper bottles.

The above recipe shows the general process, but a seasoned maker of tinctures will probably point out that the above is glossing over quite a bit of nuance.
Transdermals

In 1938 Swiss Pharmaceutical researcher Albert Hoffman was experimenting with a fungus found on the stalks of rye to see if he could isolate compounds that may be useful in medicine. He abandoned these experiments for 5 years and in 1943 he re-attempted the synthesis of one of the compounds: lysergic acid diethylamide (LSD). Mid-experiment, he accidentally absorbed some through his skin and thus the first ever “acid trip” was had, quite by accident.

The point of recounting this story here is twofold. First it is to highlight how potent the transdermal (through the skin) method of ingestion can be.

Next it’s to point out the often random and unpredictable nature of pharmaceutical experimentation. If one approaches the methods in this report haphazardly, there is no telling what the potential results could be.

All signs point to the world being far more complex and interesting than we can imagine. Indeed, the world of nanotechnology demonstrates this fact perhaps better than anything. One spectacular example is graphene. Graphite is a useful, but un-astonishing, compound in its common state. When you have a single nanolayer of it (graphene), however, it becomes the strongest substance known to man. Many times stronger than steel, but only a fraction of the weight. And by the way … it’s also a superconductor of electricity.

The world has many such mysteries left to discover.

While I am obviously in favor of citizen scientists performing thoughtful, conservative, and hopefully properly supervised experiments, I shudder to think of the negative possibilities. While the notion of health being democratized is wonderful, one has to ask: at what cost?

Now that I’ve delivered your regularly scheduled cautionary tale designed to shock you into a state of thoughtful care, back to the topic of transdermals …

Transdermal pharmaceuticals are common, but transdermal nutriceuticals are not. Perhaps they should be?

Let’s take a look at a few of the common methods of transdermal delivery.

Aqueous Solutions

Some minerals, when dissolved in water, are directly absorbable through the skin. An epsom salt bath, for example, is a common and effective way to deliver magnesium into the body.
Some folks have been known to dissolve minerals in water and spray the solution directly on the skin, a teaspoon or so at a time.

DMSO

Dimethyl Sulfoxide (DMSO) is a rather fascinating substance. When particles of the right size and molecular weight are mixed into it, those particles can enter the bloodstream quite quickly.

As mentioned in the introduction, this property can be quite dangerous. Great care needs to be taken to ensure that your skin is perfectly clean and that whatever you mix into it is uncontaminated.

Another interesting aspect of DMSO is that, by itself, it has been used in several various effective therapies as well. For example, many use it as a topical treatment for arthritis, and while this is not a treatment recognized by the medical community many alternative medical practitioners swear by it. Interestingly, so do many veterinarians and animal trainers. It is not only used to treat arthritis, but to lower inflammation from many types of injuries to the joints.

Some also use it as a source of MSM supplementation as well.

Before further exploration of transdermal delivery (or any of the crazy stuff I talk about in here), I strongly recommend you RTFM.
Appendix I: Nanotech Detoxes and Cleanses

Did I mention I’m not a doctor? I’m also a guy who has hurt himself many times through biohacking self-experimentation.

Here’s one recent example …

It was a normal day at my CrossFit gym. We went out back to line up for some high-knee warm ups. When it was my turn, on my first high-knee it felt like someone threw a tennis ball into my calf. I ignored it, but I got the same sensation each step forward.

I stopped and realized I had injured my calf. But how?

It obviously wasn’t a severed tendon or anything severe. I would have been screaming in pain and the signs would have been obvious. My coaches quickly determined that it was a sudden muscle cramp. Because it came on so suddenly and during an explosive movement, it caused a decent little tear.

Why was I cramping up? Well, I had self-administered a magnesium oxide cleanse over the last few days and it left me dehydrated and electrolyte depleted.

The end result? I was limping around for two weeks straight and it set my training back for a full month. Really, I got off light. It could have been far worse.

It bears mentioning that athletes are in a special class. We put ourselves through more physical stress and while this gives us biological advantages much of the time, at other times it makes us more susceptible to damage.

The point, however, is still valid: doing any of this stuff without proper supervision can be dangerous.

That said, let’s proceed ...
A More Complete Model of Detoxification

“Toxin” is a broad colloquial term for anything that will harm us if not expelled from the body. For a biologist, the term is hardly adequate. A toxin (a substance produced by a living entity) is not the same as a poison (a man made compound) … Some things that are deadly toxic in large doses (the cholinesterase inhibitor huperzine, for example) can be beneficial in smaller doses … And so on …

So, lumping all of this stuff together is not really precise.

Whatever you want to call it - in whatever dose. It exists. That’s not controversial. What is controversial is the notion that the body needs help getting rid of it.

We’ll just use the term “toxin” as a shorthand in this little guide for the sake of simplicity.

Now, a traditional mainstream M.D. might advise you that “the body can detoxify itself without your help.” I challenge this statement.

Indeed, I think its simply untrue on the face of it. Consider … doctors do administer “detoxifiers” like activated charcoal as an antidote for various toxins and poisons. So, should the medical community update this general advice to “the body can detoxify itself just fine, except when otherwise determined by a qualified medical professional?”

Probably good advice, actually. But professional medical care is expensive and time consuming. And what about when you have a “toxic load” in your body that is causing trouble not yet recognized and labeled by medicine? Is there a standard recognized treatment for “sick and tired?” The answer is “no” on both counts, so often folks are left to their own devices through no real choice of their own.

This is but one of the many motivations driving the DIY biohacking movement. While much caution is needed (as I hope I have adequately expressed), I believe this is a very positive trend. My personal opinion is that it’s everyone’s responsibility to have at least a basic understanding of human health, general science, and clear-thinking. Without that, we’re always going to be at the mercy of others. This creates a rather twisted symbiotic relationship where the expert can abuse their power and the “customer” takes less personal responsibility. (Indeed, it is this dynamic that allows for many of the industry abuses mentioned earlier.)

Some experts agree with this notion, of course. A really interesting case of a supremely qualified medical expert aggressively pushing self-diagnosis and treatment is Dr. Kelly Starrett. He is a PhD physiotherapist whose life mission is to teach people that “all human beings should be able to perform basic maintenance on themselves.”
Many elite athletes swear by his work. And so do I. Without exposure to him I probably would have had to stop exercising a long time ago. Dangerous self-diagnosis and self-treatment? Tell that to the heavy bag I wouldn’t be able to kick anymore if I hadn’t read *How to Be a Supple Leopard*.

Similarly many “integrative” or “naturopathic” medical practitioners believe people should be able to diagnose and treat their own illnesses. Among them are those who think detoxing and cleansing are the foundational key to wellness.

I think the general picture of wellness is much much broader than that, but at least now you have a good context from which to consider the theories I’m about to dispense in all their unqualified glory.

So, back to the statement: “the body can detox itself without your help.”

It would seem obvious to me that whether or not the body needs your help is dependent on many factors, including:

- the quality of your diet
- your body’s unique strengths and weaknesses in detoxification (determined by your general fitness, the health of each of your relevant biological systems, and so on)
- how much toxin you are exposed to (voluntarily or involuntarily)
- and so on ...

If you are exposed to an unusual toxic load, and I believe we all are every day, perhaps detoxing is becoming a prerequisite to optimal health.

Consider. When you have been poisoned and a doctor prescribes a charcoal antidote, you have obviously been exposed to what he considers an unusual toxic load. When thousands of new chemicals have been introduced to our global, office, and home environments over the last century, at what dosages do they become “unusual” when ingested in concert?

When new chemicals are tested and labeled as “safe” their effects are generally considered in a vacuum. Add a little bit of toxic load here … A little bit there … and perhaps they create a combined problem that the body can’t handle without a little help.

Still Don’t Believe It?

This conversation with Dr. Andrew Weil and this report on *Reducing Environmental Cancer Risk* by the President’s Cancer Panel should at get you considering this possibility.
Is this hypothesis correct? Time will tell. Meanwhile, I'm personally pretty aggressive about detoxing and here is the general model I use.

1. Reduce toxic load
2. Potentiate glutathione
3. Bind the toxins
4. Flush them out

There are many detox products on the market that address one, or a few, of these pathways. My belief is that without using all of them in combination the effectiveness of your detox will be greatly reduced and even potentially dangerous in some cases.

Let's take a closer look at each.
Reducing Toxic Load

The body is a complex network of interlocking systems. So far as we know, none of them operate in total isolation. So, distressing one of your systems can compromise another. Those with weakened immune systems, if all other risk factors are equal, are more likely to experience an endocrine failure, for example. And vice versa.

So, it only stands to reason that by relieving the overall distress of the body, every system benefits. (To get a more complete picture of how this is but one of three fundamental keys to health, see [The High Energy Habit.](#))

Yes, many people choose to pollute themselves (especially with food, drugs, and alcohol) and then use aggressive detoxification as a patch against bad habits. It’s a lifestyle choice that may work for some, but one would do well to remember it’s a dangerous game. If the debauchery is worth the risk to your health, then live it up. *(Perhaps as a society we may want to examine our choice of rituals … Can we have good times without polluting ourselves? Can we make delicious food that doesn’t poison us? That’s a whole ’nother conversation, but one certainly worth having. Perhaps by some of the future entrepreneurs reading this?)*

Just be aware that by lowering your toxic input in as many of the pathways described below as possible, you are greatly increasing your overall chances for health.

Food

What food is toxic and what food isn’t? What macronutrient ratios are best for optimal health? It’s a matter of intense debate, but there are a few rules of thumb that are generally uncontroversial no matter which dietary theory one subscribes to, be it Raw Veganism, Paleo, Zone, The Dulce Diet, The Bro Science Diet, or what have you …

Some may argue that one or two of these rules is unnecessary, but I don’t know of a single credible expert who would say following them is a bad idea.

1. Eat only whole unprocessed foods

Processed foods can have unintended consequences in the body. If you can’t recognize what it is. Don’t eat it.

2. Eat organic
This is the only way to ensure your food is free of pesticides and GMOs.

Many are concerned that pesticide residues are not sufficiently removed by washing produce. That’s relatively uncontroversial.

The effects of GMOs on health, on the other hand, are a matter of intense debate. But why risk it? The only way to ensure you’re eating GMO-free is to eat organic. At least, this is the current state of affairs in the U.S. where we don’t have labeling. To get the USDA Certified Organic label, a food must be GMO-free and raised without pesticides.

3. Eliminate artificial additives

If you’re following rule #1, you’re probably already doing this. Especially if you’re preparing your food yourself.

Natural additives like spices and salts are safer, but also a matter of debate.

4. If you eat meat or dairy, eat grass-fed, pasture-raised, hormone-free, organic only

Following the above rules may eliminate many of the forms of toxic stress we get from our food, no matter what diet plan you follow.

Drink

The only universally-recognized-as-safe beverage in the world is water, of course.

But heck, even water can be problematic depending on the source. Read a report some time about the contents of your local tap water. Depending on the quality, it could be adding to your general toxic load.

And how about fluoride? While concern about fluoride in water is perhaps one of the stereotypically funny hallmarks of the paranoid (so hilariously lambasted in Stanley Kubrick’s Dr. Strangelove), is there some validity to this concern? Maybe so … Consider that many countries and U.S. municipalities have fought water fluoridation because they believe it is unsafe and also ineffective in preventing tooth decay.

So, drink bottled water?

When most of the bottled water sold in the U.S. is delivered in bottles made from BPA perhaps that is not so safe, either.
What does one do?

Personally, I get purified water delivered to my home in BPA-free 5 gallon bottles every week. I have read the disclosures as well, so I know precisely what’s in it.

There are also many excellent home purification units readily available on the open market as well. The ultimate method would be to ensure that all water leading into your home is properly filtered as your skin can absorb impurities through the water while you’re showering. (Before you dismiss that as “a little too paranoid for me” remember the chapter on Transdermals.)

The safety of other beverages, like coffees, teas, juices, sodas, etc is a matter of debate, but if one is to ingest them, it would be wise to make them using a trusted water source.

Drugs

If one truly believes the statement “all drugs are bad” then the elimination of caffeine, alcohol, nicotine, and all prescription drugs would be the only behavioral choice congruent with such a belief. Maybe not an unwise policy. At least up until the point one is in a life-threatening situation and only a prescription drug can save them.

So, obviously very few truly believe that statement. What most people believe would be more accurately represented by a statement like “all illegal drugs are bad.”

But the truth is that the actual risk profiles of drugs do not mirror their legal status.

Know the risk profiles of whatever it is you are ingesting, whether it is prescribed to you or otherwise, and factor that into your overall toxicity profile.

Environment

I mentioned earlier the report on Reducing Environmental Cancer Risk by the U.S. President’s Cancer Panel. Whatever one’s political affiliation, or opinion of the political measures recommended in the report, this is a very useful resource that alerts consumers to the reality of these risks.

No matter where one sits on the free-markets-versus-regulation spectrum (on a spot somewhere between “thoughtful” and “nuanced,” I hope), informed consumers should be a priority on the agenda of anyone wanting what’s best for individuals and society as a whole.

Here are some steps you can take to lower your risk profile:

1. Move to an area with low air and water pollution.
Numbeo.com provides some excellent global comparative statistics.

2. Choose a workplace with a low risk profile.

Cooperate with your employer in finding your risk profile and in helping them lower it. Take a cooperative rather than an adversarial approach.

3. Remove contaminants from your home

The sheer volume of this problem is pretty staggering when one considers the chemicals involved in construction, paint, furniture, flooring, cleaning, pest control, hygiene, etc.

Some good places to start would be:

- Remove all BPA plastics (it is relatively uncontroversial at this point that BPA poses a significant health risk - your home probably has tons of it)
- Begin using natural alternatives for cleaning supplies
- Use natural pest control rather than pesticides
- Begin using natural alternatives for personal hygiene products
Bind the Toxins to Prepare for Elimination

An oversimplified (but still quite useful) way of looking at how the body removes toxins is as follows:

Step 1.  Bind or Break Down the Toxin

In binding, the toxin is attached to another compound to prepare it for elimination.

The body can also break down certain toxins with enzymatic reactions converting them to waste for elimination.

Step 2.  Flush the Bound or Transformed Toxins

This occurs through sweat, feces, and urine.

When either of these processes is overwhelmed, the toxic load will accumulate in the body and cause problems. The following sections are merely ways of helping the body prevent bottlenecks in its natural pathways of detoxification.

First, let’s look at binding and how to support it.

Glutathione - The Master Antioxidant

Glutathione used to be “the most important antioxidant you’ve never heard of” but recent mainstream attention has raised awareness.

With thousands of peer-reviewed studies documenting the importance of this substance, I can hardly do it justice here, but allow me to outline a few of the key features:

- it is not only the most potent intracellular anti-oxidant in the body, it also recycles other antioxidants like vitamins C and E
- it is the body’s most potent detoxifier (the most versatile endogenous toxin binding agent)
- it regulates the nitric oxide cycle, which makes it vital for circulatory and sexual health
- higher levels of it tend to correlate with health and lower levels tend to correlate with sickness and aging

I’ve lived long enough to know that whenever a new “fountain of youth” is discovered one should always view it with skepticism.  Science is ever evolving and marketers are ever marketing.
But as well documented as glutathione is, it appears to be here to stay.

Now before you rush out and start downing glutathione, you need to know that direct oral supplementation is almost worthless. Very little of it will get past your digestive tract.

Thankfully, there are alternatives. The delivery mechanisms mentioned earlier are the most effective of these alternatives (outside of direct intravenous injection), but there are still other approaches that show promise.

**Glutathione Precursors and Boosters**

If you’re not ready to swallow the (non)pill of the alternative delivery mechanisms mentioned earlier here are a few other ways to boost glutathione levels in your body.

**N-acetyl-cysteine** is one of the three amino acids that comprise the glutathione peptide. Direct supplementation is shown to boost glutathione levels.

**Hydrolyzed whey protein**, when taken in a way that preserves the macro peptides that support glutathione production, has also been found effective.

A “**glutathione blend**” of the three amino acids that comprise glutathione (l-cysteine, glycine, and l-glutamic acid) is another common approach.

**Other supplements** that have been found to increase the production or availability of glutathione are vitamin C, l-glutamine, SAMe, and alpha-lipoic-acid.

**Glutathione Synergy with Vitamin C**

If vitamin C is the most potent antioxidant in the bloodstream, and glutathione is the most powerful antioxidant in the cell, taking them together would seem to be a rather potent combination. Many practitioners of Integrative Medicine agree.

Vitamin C is much less expensive than glutathione and is tolerated in very high doses. Dr. Linus Pauling, winner of two Nobel Prizes and the pioneer of vitamin C therapy, was known to take up to 20 grams per day.

The trouble is that, like glutathione, when taken directly little of it is absorbed. It is far better absorbed than glutathione, but still much of it is lost and can cause “loose stools” (to put it delicately) when taken in high doses.

Intravenous vitamin C is thus a popular alternative for mega-dosing, but as mentioned above, liposomal preparations rival the effectiveness of IV vitamin C and can be made at home on the cheap.
Other Binders

While antioxidants like vitamin C and glutathione will reduce free radicals and lower the oxidative stress caused by toxins, other substances can be taken that will remove the toxins themselves.

Glutathione actually serves as both an anti-oxidant and a toxin binder. Yet another reason to supplement (correctly, of course).

The following substances will bind to various toxins. This can help spare glutathione for other purposes and thus make supplementation even more effective.

**Chlorella** is a single-celled algae that has many uses. This is yet another “miracle no one knows about” yet its effectiveness is recognized by both mainstream and Integrative medical practitioners alike. Far from controversial, even the generally conservative webMD lists its many uses …

As a medicine, chlorella is used for preventing cancer, reducing radiation treatment side effects, stimulating the immune system, improving response to flu vaccine, increasing white blood cell counts (especially in people with HIV infection or cancer), preventing colds, protecting the body against toxic metals such as lead and mercury, and slowing the aging process.

Chlorella is also used to increase “good” bacteria in the intestine in order to improve digestion; and to help treat ulcers, colitis, Crohn's disease, and diverticulosis.

Some people also use chlorella for the prevention of stress-related ulcers; treatment of constipation, bad breath, and hypertension; as an antioxidant; to reduce cholesterol; to increase energy; to detoxify the body; and as a source of magnesium to promote mental health, relieve premenstrual syndrome (PMS), and reduce asthma attacks. It is also used for fibromyalgia.

Make sure it says “broken cell wall” on the label, otherwise the bioavailability will be quite low.

**Activated Charcoal** is widely recognized in emergency rooms around the world as a “universal antidote” for many types of poisoning. Many people thus use it as a way of removing toxins from the body before getting to the point where your symptoms are so acute that you will be prescribed an “antidote.”

**Bentonite** is often claimed to be “many times more absorbent than activated charcoal” but I’ve only seen marketing literature claiming this. At least one study suggests they are equally effective. Personally I stick with activated charcoal is it seems to be far better studied, but some practitioners swear by bentonite. Perhaps they have seen some research I haven’t ...

**Chelation Therapy** is a method of introducing a “chelator” (a binder to metal ions - like the amino acid EDTA) intravenously to remove heavy metals from the body. Some claim this will
thus reverse atherosclerosis and a host of other symptoms some believe are related to heavy metal poisoning.

In the U.S. CT isn’t recognized as an effective treatment for atherosclerosis or other cardiovascular diseases, but it is a recognized antidote for lead poisoning and heavy metal toxicity. In other countries, however, it is recognized as a treatment for the circulatory system. Indeed, in New Zealand a bypass surgery can not be ordered unless the patient has first gone through a round of chelation therapy. (New Zealand provides free healthcare to its citizens and its motivation in regulation is to provide the most effective treatment possible at the lowest cost. I’ll let you draw your own conclusions.)

Oral chelation is often presented as a lower cost alternative to intravenous chelation therapy, but its effectiveness is debatable. EDTA taken orally, for example, doesn’t appear to be very effectively absorbed.

Cilantro (coriander) is a commonly available herb that chelates heavy metals from the body. I mix fresh cilantro into green smoothies and use it in cooking all the time.
Potentiate Glutathione

Boosting glutathione on its own can bind to some toxins, but in many reactions a catalyst is needed, and the most widely recognized are the GSTs (glutathione S-transferases).

For our purposes a deeper discussion about GSTs probably isn't necessary. But learning a few methods for boosting them is. Effective methods include supplementing with curcumin or green tea extract and Gerson Therapy.

The spice turmeric is not only loaded with curcumin, but also has anti-inflammatory and other benefits for the body. I can’t see any reason to avoid liberal use of it.

The nanotech approach, however, would be to make liposomal curcumin using the above mentioned methods for liposomal encapsulation at home, or to purchase liposomal curcumin pre-made.
Flush Them Out

As mentioned before, once toxins in your body are bound to something, they need to be expelled. If not, they’ll simply be recycled back into your system and you’re back to square one.

Your body expels toxins primarily through digestive elimination, but also through sweat and mucus.

Many find it useful to speed up the body’s process of elimination by increasing water intake (always a good idea), by exercising (also always a good idea), using saunas, and so on …

But if those methods are not enough, people often resort to colonics and other more aggressive protocols. Colonics are expensive. Some find them uncomfortable. And their safety is a matter of debate.

The following methods can simulate the effects of a colonic on the cheap …

**Magnesium Oxide** is commonly available at most health food stores and when taken in the right dosage, can have an extremely purging effect. The dosage required to produce the desired effect will vary from person to person, but the effectiveness of magnesium oxide can be increased when taken with a squeeze of lemon or ascorbic acid.

This can have you running to the bathroom rather urgently and unexpectedly. It should take about 8 hours to take effect, but that’s not a reliable figure. Plan to be at home for a little while.

**Senna** is the secret ingredient of “chinese dieter’s tea” and many other cleansing formulas. Where magnesium oxide works by oxidizing build up in your intestines, senna works by stimulating the mechanical movement of the bowels. It also takes about 8 hours to take effect.

**Saltwater flush** is a part of the “Master Cleanse” protocol (Google it - worth looking into) that is simple and very effective. The effects are similar to that of senna (it provokes a mechanical flushing of the bowels) but are far more predictable. Within an hour you can expect a rather intense “elimination urge” that can last for 10 minutes to an entire hour. The method is simple. Mix two teaspoons of sea salt with a quart of water. Mix thoroughly. Chug it down. Fun begins in one hour.
A Note About Organ-Specific Cleanses

“Absolute pure rubbish. You’re just making soap in your intestines!”

An MD friend of mine had that to say about the “gallstones” people poop out on the famous Hulda Clark Liver Cleanse protocol. I must admit, I am quite skeptical as well. Clark claimed to be able to “cure all disease” with a simple electronic device that transmits square waves through the body. This is but one of her many claims that don’t appear to be backed up by any actual science.

But there may be some validity to her liver cleanse and its many popular variations. While the visible “stones” the cleanse produces may in fact be a soap-like byproduct of the olive oil one drinks on the protocol, there may be some actual gallstones buried in them.

I’ve read many anecdotal reports about people avoiding gallstone surgery as a result of the cleanse, but dismissed them until speaking directly to someone who claimed they ...

- were diagnosed with gallstones via ultrasound
- were scheduled for gallbladder removal surgery
- did the liver cleanse
- ordered another ultrasound which came back clear
- cancelled the surgery

This doesn’t appear to be an uncommon story, but is totally dismissed by the traditional medical community.

Now, if one had the option to postpone gallbladder removal before giving this a try, should they do it? That’s between you and your doctor, but it seems pretty sensible to me to give a harmless alternative a shot before having a vital organ removed.

The liver flush is but one of the many organ-specific cleanses you can find and I think it’s definitely worth looking into. I’ve done the liver cleanse once myself and did seem to feel pretty good afterwards.
Appendix II: Further Departure Points for Experimenters and Entrepreneurs

If anyone reading this can accomplish any of the following, please post them on the original blog post for this guide.

1. Home X Meters

Home glucose meters are readily available now. One can know within moments what their blood glucose level is and this allows biohackers to discover instantly how a particular food or behavior affects their blood sugar.

What if one were able to measure the blood levels of other compounds just as effectively? The technology for this is surely available. I bet a smart member of the Maker community could even create some DIY instructions using commonly available materials.

2. A Definitive Comparison of Encapsulation Methods

The Mozafari paper above is the most respected analysis I’ve read so far, but the methods listed are not accessible to the home biohacker.

3. Comparison of Different Frequencies Used for Ultrasonic Encapsulation and Their Effectiveness by Particle Size

Do the frequencies used in ultrasonic cleaners provide the best results? Are there other DIY sonication methods available which would be more effective? Do certain frequencies work better for different particle sizes? Do sonication times improve particle size?

3. Before and After Blood Work for Liposomal Supplementation

For those using home encapsulation methods with vitamin C, glutathione, etc what measurable differences are there in serum levels of the target compounds? How does this compare to other methods?

4. List of Various Nutrients and Their Vaporization Rates

Which nutrients are ingestible by vaporization and at what temperatures?

5. List of Nebulizable Nutrients

What nutrients can be safely ingested via nebulization?
6. Pre and Post Cleanse Complete Blood Work

7. Document Cases of Pre/Post Liver Flush Ultrasound

8. And So On ...

Hang out at the original blog post for this report to swap ideas and experiences. I hope to see you there.