QUANTITATIVE MEDICINE

A DEFINITIVE GUIDE TO GETTING WELL STAYING WELL AVOIDING DISEASE AND SLOWING AGING

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HOW YOUR BODY CAN PREVENT DISEASE AND AGING

1 - DEGENERATIVE DISEASE

There is no need to die from age-related diseases, yet 70% of us do. Included here are cancer, adult onset diabetes, heart disease, dementia, and several others. Sometimes these are called degenerative diseases, sometimes chronic diseases.

We can completely prevent all of these. We can reverse most of them. The tools are all there, inside each of us. Evolution gathered them for us. Evolution is continually at work, remodeling all of life, discarding items that proved useless, retaining those that aided survival. At this point we have amassed an enormous collection of healing and repair processes. There are those that repair DNA which date all the way back to bacteria. Processes fighting cancer are found in the earliest animals. The ones cleaning arteries emerged with the appearance of the vertebrates, a relatively recent development. In the countless eons of our past, this diverse and complex collection of repair and replacement processes has accumulated—layer upon layer. But what to call it? It's no single system, but an evolutionary parade of healing mechanisms and processes that began with the inception of life itself.

This collection is far more powerful than any drugs or surgeries conjured up by our wizards of medicine. For those whose habits or actions engage these processes, age-related diseases rarely occur, and aging itself is slow. These people don't get sick. They stay energetic and healthy, with fewer aches and pains and more exuberance. But they are the minority. For most of us it isn't working. All these disease prevention mechanisms and processes are failing. They are not preventing degenerative disease.

What went wrong?

Any living thing is the accumulation of that which went before, and we are, of course, strongly adapted to the human condition, or rather, what it had been for the last few million years. Evolution, however sure, creeps forward with a glacial step. It deals poorly with abrupt change, which is unfortunate, because the agricultural revolution, which began only 10,000 years ago, so thoroughly upended our lifestyle that we have only begun to catch up.

What began then, eventually spreading worldwide, was an abrupt shift from a million-year history of an irregular protein and fat diet, a life involving fierce bursts of activity, to a new type of starch-based diet, and a sedentary, though arduous, sort of life. In the preceding million years, we had successfully endured a huge confusion of ordeals and misfortunes, and were well adapted to deal with any of them, but the changes that arrived with the agricultural revolution were new, never seen before, and our wonderfully evolved health management systems and processes didn't know what to do with them—*and they still don't.*

This should be an era of ease and plenty. And in many ways it is that, but a strange paradox intervenes and casts an unexpected gloom: *all this abundance and ease convinces our body that it should prepare for a famine*. We will shortly explain the survival logic at work here, but as part of this famine preparation, all "unnecessary" processes are shut down, including much of the degenerative disease prevention. This has the unintended consequence of opening the gates and giving these diseases free rein.

This is certainly an odd and unfortunate conclusion for our body to reach. How could unprecedented wealth and ease take such a sinister turn?

In all of us, there is a survival point of view operating behind the scenes, forcing a life script we cannot escape. It holds us to its ancient logic, a

logic driven by survival, and despite the obsolescence of such primordial concerns, the unseen parts of us that manage energy and healing still heed the rules and remnants of those times long past.

Simply put, our body thinks we're starving, or about to. And its logic? We aren't doing the right things: we aren't hunting or gathering. Worse, we are eating food that normally would become available only before the cold, lean winter. The agricultural revolution immersed us quite suddenly into this new mode of life, and our body—the unseen part that manages energy and healing—is only just beginning, after all this time, to sort it all out.

Impressed firmly in our inner clockworks are certain constant rules, etched there by millions of years of life experience:

- To get food, you must hunt or gather. If you aren't doing this, the logical reason is that there is no food available.
- If you are getting anything sweet or starchy, it is late summer and a cold and hard winter lies ahead.

With food running out and winter approaching, perhaps an ice age one, survival is key. Best to store the immediate food supply as fat. Reduce energy levels. Put off anything that can wait for a time of plenty. Put off repair, healing, and replacement. Save these for another day.

The agricultural revolution has become the agricultural institution and we can never return to the old ways, nor would most of us want to. But can we construct a link back to the prior health? Can we convince our archaic inner processes to use the energy we consume to heal, and not store it as fat? Convince it to enable again all these powerful repair mechanisms? The answer is yes, and Quantitative Medicine will show how.

THE NATURE OF DEGENERATIVE DISEASE

Infectious disease involves an invader—a virus or bacteria perhaps. It invaded via a cut or by eating bad food, and then spread. The immune system fights back, usually successfully. Once the disease is fought off, the invader is gone, having been fully annihilated.

Degenerative diseases are different. They are occurring continuously, starting from birth. The immune system fights them as well, but it's not always clear who has the upper hand. These diseases have a tipping

point nature. Cancer is a good example. We have an astronomical number of cells—something like 50 followed by twelve 0's—not a number we can easily contemplate. At any given time, some millions of these cells are defective in some way. This is a lot of cells, but it is a very small percentage of the grand total. The immune system monitors for this, and will kill off these errant cells. However, some may malfunction in a cancerous sort of way. They may start aggressively dividing and growing, and if the immune system doesn't catch it, a tumor has been started. Even so, the immune system will usually get on the job and kill the tumor. But if it doesn't, the tumor will keep growing and a cancer can result.

Here we have bad cells pushing against the immune system. Who will win? On one side, we have the number of errant cells. If the number is low, problems are less likely. This can vary a lot. Smokers will have 20 times as many damaged cells in their lungs as nonsmokers. We also accumulate more defective cells as we age. On the other side, how active is the immune system? If the body is healthy and energetic, the immune system will likely be in a similar condition. A weakened immune system, however, might not be able to prevent a budding cancer from taking hold.

This same sort of tension seems to be typical of all degenerative diseases. Something is promoting them within the body, and some other process is trying to prevent them or repair the damage. The progression of the disease depends on the balance between the intensity of the assault and the body's ability to push it back. These two are locked into a sort of death spiral. If the assault succeeds, the body's ability to push back is diminished. Things then spin quickly out of control. They can spin the other way as well; anything that reduces the level of assault will increase the body's ability to fight back. So, being partly sick isn't a very stable situation. It will likely get worse or better—a tipping point situation.

Throughout the book, we tend to lump heart disease, cancer, and adult onset diabetes together; yet these seem like very different diseases. They are, of course, in their final manifestations, but their origins share a common ground. Something is amiss and off balance. At the microscopic level, various sorts of normal cellular trash—free radicals, products of oxidation, and other potentially damaging things—are allowed to accumulate, cause problems, and instigate inflammation. At this level,

all degenerative disease is interrelated. One disease or another is taking hold because the usual processes—processes that are otherwise more than capable of rolling it back—are inhibited. Some of us are more prone to cancer, or heart disease, or some other diseases, but none of these need happen if the body's defenses are fully engaged.

WHO GETS SICK? WHO IS SPARED?

How can we know for certain that degenerative disease can be avoided? There are at least some identifiable groups that get almost none of these diseases. They are known as hunter-gatherers. You may be surprised to hear that there are any still around, but perhaps as many as 200 tribes are scattered here and there, in various isolated places. One island group off the coast of India is a complete unknown. Potential visitors, helicopters, and passing ships are all met with volleys of arrows.

Research into more accommodating tribes has been going on for at least a century, and a common thread runs through it all: members of hunter-gatherer societies rarely get cancer, heart disease, or other degenerative diseases. This contrasts sharply with our world, where 70% of us now die from one of these. This almost total absence among the hunter-gatherers strongly suggests that degenerative disease is not inevitable.

A hundred years ago, there were far more hunter-gatherer tribes, and much more isolation. There are numerous reports from various explorers and missionary doctors. From Albert Schweitzer, *"On my arrival in Gabon [1910], I was astonished to encounter no cases of cancer. I cannot, of course, say positively that there was no cancer at all, but, like other frontier doctors, I can only say that if any cases existed they must have been quite rare."* These sorts of medical surprises seem to have been the rule. Cancer, diabetes, and other diseases were nowhere to be found in the hunter-gatherer populations. There are a variety of references to hunter-gatherer health in the annotated bibliography.

Suppose we were to dive in and join a hunter-gatherer tribe today. Would that reverse degenerative disease? Apparently, the answer is yes! It is reported that various members of Australian Aboriginal tribes moved to the cities, and soon became afflicted with the various "modern" diseases. Some of these people saw the light and moved back

to the bush, and within a short period of time, their newly acquired diseases disappeared.

Ideally, we'd like to achieve a healthy state that will reduce disease risk without becoming a hunter-gatherer, and that is what Quantitative Medicine is all about. But how far do we have to go? The French, for instance, have a much lower rate of heart disease—the lowest in the world actually (not counting the hunter-gatherers). Eating like the French wouldn't necessarily be such an ordeal.

What's underlying all of this? The body tightly regulates and controls internal processes like heart rate and hormone levels, or at least it tries to. Body temperature is a good example, but just about everything else is controlled as well. Testosterone, glucose, cholesterol, cortisol, insulin, and fat are other examples. All of these highly-regulated circulating hormones, biochemicals, particles, and molecules largely define your health. If your body is able to regulate these into their proper ranges, you will be healthy. If they are out of whack, your health may be compromised. Degenerative disease can, and probably will, occur. This should seem odd. If these things are controlled, wouldn't they be controlled for our benefit, and degenerative diseases therefore be somehow eliminated?

The short answer is: it's trying, but we have pulled things so far away from their natural primordial ranges, that it can't. The body is trying to get these levels under control, but it is simply overwhelmed by a diet that it has never learned to deal with. Almost all adult onset diabetics have dangerous blood sugar and insulin levels. This is primarily due to diet. Similar lifestyle attributes are strongly associated with the other degenerative diseases. The body can maintain a very healthy state and prevent these diseases, but, in a variety of ways, our modern lifestyle prevents it from doing so.

This is by no means a new notion. It occasionally shows up in the medical literature as the "discordance hypothesis," but so far this idea hasn't gotten much traction in the popular press.

But what about genetics? One would suppose that genetics must play a large role. Consider the Japanese. Their rates of both heart disease and cancer are much lower than those of Americans. It would be quite reasonable here to assume genetics was somehow protecting the Japanese, but this view fails to hold up: Japanese-Hawaiians generally follow the American diet and get disease at the American rate. So, looking at large groups, genetics seems

to be less important. However, at the individual level, genetics clearly does make a difference. So, as is usual with nature versus nurture arguments, the conclusion is both.

For our purposes, lifestyle would seem to be by far the more important. First, genetics obviously can't be changed. Second, when whole groups of people are considered, the statistics are pretty overwhelming. Hunter-gatherers get almost no degenerative diseases, but for the rest of the planet, 70% die from these. 0% versus 70%. This is a huge difference, and points very strongly to lifestyle. Hunter-gatherers are not genetically different. In fact, when these "immune" hunter-gatherers are assimilated into our world, they rapidly begin to develop all our degenerative diseases as well.

Other than some specific situations, like celiac disease, you should view genetics, especially your own, as a predisposition, and no more than that. We may indeed be taller, shorter, skinnier, fatter, blonder, or whatever, but degenerative disease is different. We are NOT destined to get these diseases because of genetics. If we were, hunter-gatherers would get them too, but they don't. Since we have the same genetic mix, we don't have to get these diseases either. Let degenerative disease in, and some will get heart disease, others cancer. That's the role of genetics. If degenerative disease gets no foothold, genetics has little role to play.

QUANTITATIVE MEDICINE

Our ancient ancestors had an unbroken continuity of knowledge of the Earth: their Earth, their world, and their relationship with it. Sometimes this would mean difficult times, but not always. Often life was leisurely. They had evolved with what their world offered; they survived and thrived. Robust health was part of that life. Civilization dissolved the connection, and in a health sense, we are now cut loose and adrift.

Quantitative Medicine bridges that gap, which, by this point, has evolved into more of a chasm. Most of us don't want to return to a hunter-gatherer way of life, but there are other routes to the ideal healthy state—peak health. This is a goal well worth the pursuit. In this ideal state of health, degenerative disease is pushed back, held at bay, and aging is slow. This is the good life.

All those enjoying peak health have certain attributes in common with each other. These attributes are evident in biological markers, many of which

will be familiar: blood pressure, glucose, triglycerides, etc. For these healthy people, all such measurements are in the same desirable ranges.

This is quite surprising if you think about it. It means a healthy Inuit and a healthy Australian bush man, people from opposite corners of the world, with vastly different diets, will have similar numbers. Odd indeed, but true.

Even more amazing is that it works both ways. If you can somehow push your own numbers to these healthy zones—push them there without the help of drugs—you will be healthy too, and degenerative disease will retreat. So besides being a universal measure of health—well worldwide anyway—these numbers are also the *levers* of health. Push or pull them all to their ideal zones and good health is yours. If some areas aren't right though, degenerative disease has a route in. The changes needed vary considerably from person to person, but the ideal numbers are the same for everybody. Knowing quite precisely which numbers are the key ones, what they should be for peak health, and how to drive them there is the essence of Quantitative Medicine.

Here is the simple premise Quantitative Medicine offers: if a person's numbers are in these ideal ranges, they won't get degenerative disease and they will age slowly. Further, no matter what condition someone is in now, or in what state of disease, if their numbers are driven to their ideal ranges, disease will stop occurring, and in many cases, existing disease will reverse.

So by measuring, you can determine your health, and also see how far it is from ideal. Quantitative Medicine explains exactly how to do this. Once you measure, you will know all your numbers, and you can then devise a lifestyle strategy to push those measurements into the ideal ranges. Quantitative Medicine is able to tell you how to do this too.

Quantitative Medicine is a complete health management system. Follow its suggestions and protocols and the risk for degenerative disease is very low. As far as degenerative disease prevention goes, it is complete. It alone is all you need. It has little use for supplements, vitamins, antioxidants, whole grain, high colonics, vegan diets, lotions, magic crystals, or the like. The tools to prevent disease lie entirely within oneself, but since everyone is different, the "best" lifestyle choices are unique to each of us.

Everyone is quite capable of maintaining pristine health into very old age. The body knows how to handle a wide variety of environments and lifestyles. Unfortunately, our "civilized" lifestyle appears to be a major exception, at least for many. We are still largely a product of what went on a million years earlier.

What Exactly Is Lifestyle

Clearly we're not talking about Versace versus Armani, or urban versus rural living. We mean the way you "style" your life from a health perspective. This may include many things, but the four to be explored in detail are:

- **Nutrition**. Which parts of your diet are improving your specific health, and which are damaging it.
- **Exercise**. Which types are best, what they help, why they help, and which should be avoided.
- **Spiritual Discipline or Meditation**. Reducing stress. High stress has huge negative health implications.
- **Sleep**. The ideal amount and its importance.

If all four of these lifestyle elements are right—right for you, that is—the risk of degenerative disease will be low, and you can look forward to a long healthy life. However, what is right varies from person to person, and determining this and acting on it through lifestyle change are the main purposes of Quantitative Medicine.

How Can We Know Our Own Health?

This mismatch between the ideal and the actual affects different people in different ways. For instance, can you eat grain? Or does it cause problems? Measure. If your numbers are OK, then eating grain is OK. Enjoy your grain. If the numbers are not OK, we can usually predict the dietary changes needed to correct them. This may mean cutting down on grain or eating more protein or different fats. So, try it and see. "Quantify" yourself.

Quantitative Medicine works, and works well. This methodology has been refined and used on some 2,000 patients in Dr. Nichols's practice over the last 20 years. The results have been dramatic, and the method can be used by almost anyone. It is straightforward, and it will be explained step-by-step in PART II of this book.

All degenerative diseases are interrelated. They are all manifestations of basically the same problem: our civilization has evolved in a way that damages our health. In this sense, our civilization itself is the disease. It creates an imbalance that allows these various degenerative diseases to advance, each in their own insidious way. Restore the balance, and they all retreat.

If we could know exactly what we should eat and how we should exercise, there would be little need for Quantitative Medicine. Many people

think they are healthy, but this is usually self-deception. The abundant diet and physically undemanding life that our modern civilization has blessed us with *causes* 70% of us to die from degenerative disease. Yet, we don't see this connection until it is pointed out to us. These diseases are preventable, avoidable, but no fixed regime, no standard diet will work, at least not for everybody. There is an imperative need to quantify—to measure exact levels first—and then design a lifestyle that will optimize them.

The earlier health is quantified, the better. The information needed is available via blood tests and scans. You may already have some such results. You will find out how to interpret these various numbers in PART II, and, more importantly, how to modify them. By doing so, you can, and will, improve your health. This is Quantitative Medicine in action. If your numbers are put right, the prevention and repair processes are engaged, you are energetic, disease is pushed back, and aging is slow. This is the good life! All factors that may be inhibiting the body's disease-fighting ability can be fixed with lifestyle changes.

How Did We Drift So Far Off Track?

Beliefs attempt to impose understanding and order on our chaotic world, a world largely beyond our control. Without some system of beliefs, we would be largely adrift, undirected, unfocused. Governments, schools, religions, and business interests constantly exploit this by supplying us with their preferred versions. This works. We adopt many of these beliefs, though this is not always in our best interest (to put it mildly). These beliefs may have a presumed basis in fact, or possibly not; they are at least thought to be true. The quality of the facts underpinning these beliefs varies enormously.

The biology of even the simplest creature still guards far more secrets than it has divulged. Scale this up to the level of a human being, and the problem compounds almost without measure. Though airs of deep knowledge and understanding are cultivated by the learned classes, the true understanding of human biology is so shallow that beliefs overwhelmingly dominate (though often given the credence of established scientific fact). Much current medical wisdom is just belief. But good or bad, these beliefs tend to persist, often long after it is clear that people are being harmed.

You may already be managing your health according to a set of beliefs and you might do well to analyze them. For each of the things you are or

aren't currently doing, things that could affect your health, ask yourself, "Why do I believe this is good for me?"

Some of the things you believe will be true, but others not. Some may apply to the general public, but not to you. Some may reflect older medical thinking that has since been revised. And of course—we are all human—some of our beliefs are there because we earnestly wish them to be.

There is absolutely no need to have a set of beliefs regarding your own health that is anything other than fact based. Health is entirely quantifiable. Though complex, health is not a "chaotic world largely beyond our control." Whatever the source of these beliefs, with measurement they can be tested, and then corrected, improved, or tossed out as necessary.

Health beliefs frequently come from government, business, or our own wishful thinking.

Here is a U.S. government-generated belief: "The food pyramid is how you should eat." The reality is this. The food pyramid is a high-starch diet. For 30-50% of the population, this is going to cause obesity and increase the risk of adult onset diabetes and heart disease. In fact, it already has.

An industry-generated belief: "Eat whole grain." This is an attempt to save high-profit grain-based products like cereal. While whole grain is slightly better than refined grain, the real question is, "Should you be eating grain at all?"

Wishful thinking belief: "Jeanne Calment lived to 122 and was a smoker. (True!) Therefore smoking couldn't be bad for you."

So as a preliminary step, try to put all your medical opinions and beliefs on hold, at least for now. After you have finished the book, or PART II at

least, you can reassess. At that point, you will be far better informed, both about health in general and about your own specifically.

Quite a lot of the medical wisdom that has been drummed into our heads for the last 50 years is either useless or patently false. Here is a list of false medical folklore we plan to lay asunder:

- Saturated fat is bad for you.
- Foods with cholesterol should be avoided.
- Overweight is unhealthy.
- Skinny is healthy.
- High cholesterol is very risky.
- Low-fat diets are healthy.
- Whole grains are good for you.
- Red meat is bad for you.
- An hour of mild aerobic exercise daily is good for you.
- Statins should be prescribed for those with even a slight risk of heart disease.

Every single one of these is provably false. Many of these "beliefs" were generated to serve some agenda—typically not our own. You may have believed in at least a couple of these. No one can wholly escape the media barrage.

A few things that are true:

- Trans fats are bad (except those naturally occurring).
- Smoking is bad.
- Alcohol in excess of one or two drinks a day is bad.
- Rapidly changing weight, up or down, is bad.
- Not exercising is bad.
- Grass-fed meat and organic food are a lot better for you.
- Poor sleep is very unhealthy.
- Chronic stress is very unhealthy.
- Fat does not make you fat.

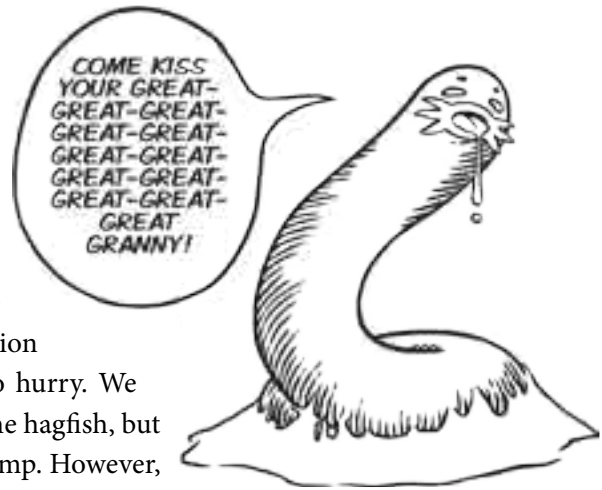
Key Points

1 - Degenerative Disease

- Currently 70% die from degenerative disease, cancer, heart disease, etc.
- The body can prevent all of this, leading to a long disease-free life.
- Modern lifestyle thwarts this repair and renewal process.
- The status of our own repair and renewal processes can be measured.
- This status can be changed through lifestyle modification.
- This book gives you all the tools you need to do this.

2 - HEALTH IS CONTROLLED

Why are we the way we are? We are the accumulation of what worked in the past. Things that didn't work, and the creatures that embodied them, were left behind. Natural selection is not sentimental. We descend from an unbroken line of vertebrates that successfully reproduced: perhaps 100 million consecutive generations. Quite a run! According to Richard Dawkins' fascinating book, *The Ancestor's Tale,* we are 22 species removed from the earliest vertebrate, a primitive and especially ugly eel-like thing called a hagfish.



This slimy creature oozed onto the scene around 500 million years ago, and 22 species later, here we are. That's about 25 million years per species. We parted company with the chimpanzee *only* seven million years ago. Evolution is in no hurry. We have little in common with the hagfish, but a lot in common with the chimp. However, one interesting brain organ shared by all three is the hypothalamus, which is the master regulator, and seems largely driven by survival. It is the hypothalamus that is controlling and regulating all those healing processes mentioned earlier. For the hagfish, and quite a few species that followed, this was about all the brain there

was. It is still the command center, and it has been on the job for 500 million years, so it's had quite a while to hone its skills.

Survival depends on many things. There are the obvious, like predator avoidance, as well as a large number of internal items, such as managing metabolism, sleep, cell repair, and renewal. These are all very complex and interconnected processes, even in the lowly hagfish. Given our impressively long record of reproductive success, we may reasonably assume that we have a very well developed and sophisticated hypothalamus. Natural selection effectively guarantees this for us.

EVERYTHING HAS A REASON

Living things, especially humans, are incredibly complex, and from an evolutionary point of view, little has been left to chance. Whatever features improved survival were nurtured, managed, and optimized. Unnecessary abilities were usually jettisoned as excess baggage because they used precious energy (food). Maybe it would be better to say that everything at least *had* a reason, as some things, such as the appendix, linger on with no apparent one. But to understand most bodily processes, the key is survival. Whatever is happening is happening because at some point in the past, it made a positive difference to our survival chances.

Survival usually implies economy. New features often cost energy, and for most of our 500 million years, energy—meaning food—has not been plentiful. For any new feature to make sense, it had to improve overall survival. Any additional cost had to be more than offset by the additional advantage the new feature conveyed.

We used to be able to make our own vitamins. But since we were getting them from food anyway, why waste energy making them on our own? Thus, this ability was lost. Though it might have come in handy to hang on to our vitamin-making skills, apparently it wasn't "cost effective."

Our big brains use a lot of energy. Are they worth it? Apparently, by

TOP LAND PREDATORS

using them, we could figure out ways to get enough additional food to power them. In fact, primarily because of our big brains, we became the most successful predator in history. We left Africa and thrived everywhere we went. No animal, small or large, slow or fast, was safe from us. And if today's hunter-gatherers are any indication, we were so efficient at it that it was practically a part-time activity. As we were becoming the apex predator, our primate cousins were, and still are, swinging from the trees, hoping to hold on to their unique habitats. So, the investment in brains definitely paid off. (Curiously, Neanderthals had slightly bigger brains.)

Energy management remains the big story, though. To conserve energy, our body will actually tear down bone and muscle if there is a food shortage. It will even do so if it *thinks* a shortage is coming.

EVERYTHING IS CONTROLLED AND REGULATED

By regulated, we mean something is set to a certain level. Body temperature is regulated to 98.6 ºF. For this to occur, three items must be present:

1. Something called the "regulator" has to "know" that 98.6 ºF is the "right" temperature (called the set-point).
2. This regulator has to be able to measure the body's temperature (called the monitor or sensor).
3. Finally the regulator has to be able to appropriately push the temperature up or down in order to drive it to the 98.6 ºF set-point (has to be able to control).

Almost every key bodily function, hormone, cycle, response, and so on, is regulated, much of it tightly. Body temperature is highly regulated in birds and mammals. This has a huge energy cost, and both have evolved some form of insulation to help deal with it. Cholesterol is also tightly regulated, as are glucose, insulin, thyroxin, triglycerides, fat storage, sleep cycles, onset of puberty, rate of aging, and literally hundreds more. And regulated to a single end: to maximize the chances of survival. So summarizing:

- Everything has a survival-oriented reason.
- Everything is controlled and regulated.

It is the hypothalamus that is managing these two items. It is a little brain with a big agenda. Most of the controlling processes are located there, and its main concern is survival.

Soon, we will explain how the various aspects of modern civilization challenge the regulatory ability of our body, and force it into a state where it cannot maintain optimum health and energy levels. The net result is an imbalanced low-energy situation, which vastly increases risk of heart disease, cancer, adult onset diabetes, Alzheimer's, arthritis, osteoporosis, fat accumulation, and accelerated aging. Perhaps imbalanced isn't the right word. Overloaded might be a better choice. In either case, the body is attempting to react to the situation it finds itself in. The problem is that it is reacting in a way that doesn't make sense, given our modern conditions, but that indeed did make sense for the millions of years that came before. We can't change how the body reacts, but we can certainly change *what* it reacts to. By choosing this properly, we can restore the body's ability to maintain health and energy. Degenerative disease doesn't have to be the inevitable outcome.

We could add the obvious: all this survival optimization is glacially slow. It isn't really clear why that is best, as sometimes things change rapidly. Plants and animals that can't adapt become extinct, and 99.99% of the living things that evolution has hatched so far have indeed done so. Of course, extinction of one (dinosaurs) creates opportunities for others (us). Maybe it is survival in a larger sense. Life itself goes on.

THE HYPOTHALAMUS

The hypothalamus arrived with the vertebrates. A huge variety of regulation and control functions seem to have been gathered together and installed in it. It can't directly cause you to flex a muscle, but, interestingly, it knows if you do. It also continuously measures all the circulating biochemicals and hormones, and is constantly making adjustments. It has outbound nerves going to several other organs, and completely controls a tiny hormone factory, called the pituitary gland, located directly beneath it.

We would probably benefit if we had a greater awareness of its ideas and actions. What would it have to tell us . . .

INTERVIEWER: What are you called?

HYPOTHALAMUS: I don't have a name. I live under the Thalamus so they named me Under Thalamus, but they changed it to Greek so it would sound fancier.

INTERVIEWER: So what is it you do, exactly?

HYPOTHALAMUS: Ask me instead what I don't do. I regulate and control metabolism, digestion, fat storage, energy level, sleep, puberty, fight-or-flight. I maintain your health. I control renewal and repair. I can order up a fix for almost anything. I can slow aging to a crawl. I can …

INTERVIEWER: And you have no name? Incredible. Sounds like you're the Big Cheese.

HYPOTHALAMUS: I like it. Big Cheese. Call me that. Actually, let's translate it into Greek. Sounds more impressive. From now on call me Megalotyri. And tell that lumbering neocortex to show more respect. How am I supposed to keep things in order with all the messes it makes. . .

INTERVIEWER: OK, OK, thanks. Now, for the weather. . .

Would we really want conscious awareness of that little scold? Maybe, maybe not, but we'd best keep it happy. Though our "Megalotyri" is a bit of a stuffed shirt, it is only exaggerating slightly. It is definitely in charge of metabolism and energy management. It very directly decides what to do with the food you eat: whether to burn it or store it as fat. It decides whether or not to burn the fat you already have. It controls your sleep, overall energy, whether cells repair or degrade, whether muscle or bone is built or torn down, and so on. It decides the levels for many of the hormones and other circulating biochemicals, and tightly regulates several of them. It has numerous timers: some daily ones that manage sleep cycles, one for the menstrual cycle. It even decides when to start puberty.

The hypothalamus does not control your conscious self, though it can certainly affect your mood, alertness, pep, etc., but these are consequences of its actions, not an attempted takeover. You do have free will. You can do that which pleases the hypothalamus, or that which thwarts it. In this way, you affect some control over it. The hypothalamus is strong-willed, but pretty predictable.

Dr. Mike's Philosophical Sidebar

Paleo This, Cro-Magnon That

Many of you will have heard one version or another of "mankind is old and our diet is new and it is killing us." And, basically, it is true. Virtually all the world was colonized by our genetic ancestors over 20,000 years ago, and they survived until the end of the last Great Ice Age, about 10,000 years ago. Then "they" became "us." Out of deserts mountains, out of ice and snow and struggle, emerged a fast, strong, intelligent, highly athletic King of All Jungles, King of All Mountains, the mankind we know today. Out of such places and times emerged pretty much our entire genome and our entire metabolic heritage.

There are numerous theories of genetic change and drift, but no version gives a plausible account of why we should eat sugar or starch—frankly, because almost none of those things existed in the 50,000-year history of our ancestors.

So what? Well, the body always makes sense, and so it makes sense that eating these things might not be good for us. Thus the rise of agriculture, and I mean sufficient agriculture for grains to become a large part of our caloric base, is clearly associated with diabetes, coronary artery disease, and the like. As primitive cultures rise out of the dietary level of subsistence, they start developing degenerative diseases like diabetes. It seems fashionable to blame the Western Diet for the rise of diabetes in India, China, and elsewhere; it is not the Western Diet, but the inevitable consequence of getting enough to eat of what everyone wants: in China enough rice, in India enough wheat, and in Central America enough tortillas and cornmeal. It's the grains, the starch, in sufficient amounts that kills.

Still, "the body always makes sense," and our ancestors could not have evolved to tolerate such foods. Our modern (less than 5,000 years old) sensibilities may not like it, but we are genetic omnivores: hunters and gatherers of what the harsh landscape of the last Great Ice Age afforded. OK, you've have heard it before and it makes sense to you.

Well, this same line of thought will help you understand why endurance exercise, especially long distance running, or staying on the treadmill at the gym for prolonged periods, is so harmful. And be clear, it is harmful. Well done studies tracking the rate of the progression of coronary artery disease have shown that the only way to age your arteries FASTER than long distance running is not to exercise at all.

Our body evolved to cope with a wide range of conditions: times of plenty, times of scarcity, times of terror, and times of joy suffused with hope, gratitude, and peace. Our body can swing from making lots of new stuff, like muscle and bone and babies, to tearing down our very bone and hearts and brains to generate fuel to survive until the next time of plenty.

Times of SCARCITY meant running or walking, often great distances, to find new prey or new leaves and roots and nuts; to find new hunting and grazing grounds. It makes sense that this demanded a low-energy transportation method, which we call walking or jogging. The mechanism that turns down our metabolism, so we don't run out of fuel before those fields of plenty are found, is stress and eccentric exercise. Eccentric exercise is that use of muscles whereby they resist getting longer rather than forcefully getting shorter. Jogging increases the metabolic effects of stress so that we will burn fewer calories for work done. But lest you be misled, sprinting does just the opposite.

You will always need your ability to hunt, to gather, to fish. Exercise that increases strength, foot speed, hand/eye coordination, flexibility, agility, multi-planar capacity, and power is a positive adaptive capacity for the good times, not for famine. This kind of exercise increases your metabolism, your immunity, your intellect, your memory—your fun!

But we live in the modern world and eat food from a depleted food chain, and most of us would wind up dead if we depended on bow hunting and the outcome of wrestling crocodiles. So we need a method to approximate the benefits of such a life without the risks. This is an attainable goal.

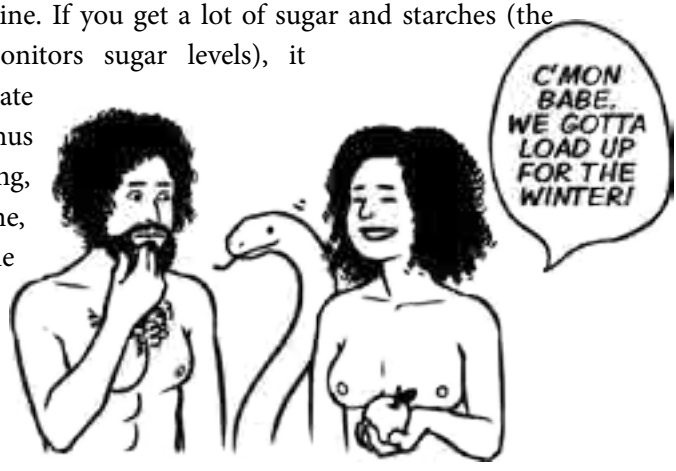
The hypothalamus thinks we are still hunter-gatherers, at least as far as food and exercise are concerned. That is so central to health that it bears repeating: The hypothalamus manages virtually all of our bodily functions, but does so as though we were still hunter-gatherers. Of course, 10,000 years ago, we all were, and this is an eye-blink in the grand scheme of things. Evolution simply doesn't move that fast. There are some changes, but basically, the hypothalamus is managing us now like it managed us in ancient times.

Our own hypothalamus has broad abilities to effectively metabolize food and can adapt to just about any combination: mostly fat, mostly protein, or in some cases, mostly carbs. This, in turn, gives us great adaptability, and no need for any particular "habitat."

The Grand Hypothalamic Gotcha

We changed from hunting and gathering to the agricultural lifestyle way too fast. The hypothalamus will eventually catch up, but this may take tens of thousands of years. In the meantime it continues to manage us as it always has, and therein lies the grand hypothalamic gotcha: for most of us, scarcity is a thing of the past, but in our millennia of evolution, an ample food supply was fleeting at best. So long protracted periods of prosperity appear to be something the hypothalamus simply can't grasp.

Almost anything out of the ordinary tends to set into motion the well-oiled famine management machine. If we aren't hunting (the hypothalamus monitors your exercise), it most likely means there is nothing to hunt, and that means a famine. If you get a lot of sugar and starches (the hypothalamus monitors sugar levels), it must mean it's late summer and thus winter is coming, yet another famine, and on and on. The hypothalamus seems ever ready to go into famine mode, store everything



it can as fat, cut the energy level, shut down renewal and repair, and alter and adjust a variety of other bodily functions. All this made all sorts of survival sense 10,000 years ago, but many of these actions have now become obsolete, if not downright detrimental.

So, keep your hypothalamus happy. Convince it that famine preparation isn't the appropriate response, and the good life is yours. You will be well, or will become well. You will live a long, happy life. If you are doing something the hypothalamus interprets as hunting or gathering, and eating stuff that would be plausible bounty from those activities, it will turn on all the astounding prevention, repair, and renewal processes.

So how do we do that? What will convince the hypothalamus that we are not in any danger of starvation, and that it needn't toss us into some unhealthy low-energy conservation mode? Generally the right combination of diet, exercise, sleep, and low stress will do the trick. It takes all four, and determining how to optimize each of these is a major part of Quantitative Medicine. We will take a look at the same circulating biochemicals (glucose, cholesterol, etc.) that the hypothalamus is monitoring and then undertake to adjust them to known healthy levels. Interestingly, even though people vary enormously in their body chemistry and response to lifestyle changes, the ideal levels of the various blood markers are the same for everyone. This is quite fortunate, because it gives the entire human race a common health target. If this weren't the case, this book wouldn't exist.

To summarize: We know where we want the levels to be. Quantitative Medicine is then used to figure out where the levels actually are and how to send them in the right direction.

WHAT EXACTLY IS REGULATION?

To most people, regulation means rules or guidelines. However, in our context, it means forcing something to a precise value, and we will use terminology like "body temperature is regulated to 98.6°." In spite of a huge variety of foods and metabolic demands that would especially be part and parcel of the hunter-gatherer lifestyle, the body attempts to create a "standard" and optimal internal environment by doing exactly this sort of regulation.

Feedback Control Theory

It sounds like an exotic engineering discipline, and indeed it is, but you are already an expert at feedback control theory. Let's suppose you are on a road trip. Speed limit 65 mph, light traffic, on a particularly boring but speed-trap- infested Interstate. Your wife's second cousin, the highway patrolman, has told you they only ticket 10 miles over the speed limit, so you decide you are going to go 74 mph. If you go over this, you risk a ticket: if under, you waste your precious time.

So how do you do this? You know how, of course (no fair using cruise control), but let's walk through the steps. Do you keep the gas pedal at a certain spot, say depressed one inch? Of course not. You don't even think about that. Besides, to maintain 74 mph, you'll need to give it gas to get up hills and let off or maybe even brake going down. How do you know you are going 74? You watch your very accurate speedometer like a hawk. You step on the gas till you are close to 74, then ease off. If the speed starts to pick up, perhaps due to a tailwind, you ease off some more. The gas pedal is getting adjusted all the time, depending on various external conditions, so that the speed is maintained at exactly 74 mph.

In control theory parlance, 74 mph is your *reference* or *set-point*. Your actual speed is your *output* and ideally is the same as your *reference*. You *monitor* this output by looking at the speedometer, the *input* is the gas pedal and sometimes the brake, and the *controller* is you. In this situation, other things besides the gas pedal input are affecting the output speed: uphill, downhill, headwind, tailwind, and so on.

So, you are riding along at 74, over hill and dale. You are in homeostasis. You are able to control the speed to exactly 74.

However, if you come to a hill that is steep enough, you won't be able to climb it at 74 mph, even with the gas pedal all the way to the floor. Your speed will fall off. You have exceeded the capability of your system to regulate. At this point, you are no longer in homeostasis.

Now, the purpose of this book is not to teach you how to evade speed traps, but rather to gain an understanding of the things that the body regulates, and if necessary, means by which to alter them. For most people, the desired set-point or reference for blood sugar (glucose) is around 74 mg/dl. This translates to about one teaspoon of sugar in your five quarts of blood. This is not a lot of sugar, but if it goes too low, below 40 mg/dl,

say, a coma can result, so this one is critical. Less critical, but far more common, is that it goes too high. The hypothalamus is in charge of all of this, and has a variety of ways to control the blood sugar level (output) to match its 74 mg/dl reference.

Suppose you eat some sugar or starch. This gets quickly into the bloodstream as glucose. One teaspoon of sugar would bump the glucose to maybe 110 mg/dl. Or at least it would try, but such an increase wouldn't happen. The glucose level is monitored by the hypothalamus, which has a vast spy network of neurons located in every nook and cranny. As soon as the sugar level starts up, the hypothalamus order insulin to be secreted. This is our *input*. Insulin will clear out that excess sugar, driving it into muscle, fat, or storing it in the liver. How much insulin? This is hard to say. The hypothalamus will dump as much as it needs to bring the level back to 74 mg/dl. As soon as 74 mg/dl is reached, the insulin dumping is curtailed. If the level goes below 74, the hypothalamus can boost it back up by causing another hormone to be secreted. As long as the hypothalamus can adjust the glucose level to the 74 mg/dl *reference* or *set-point*, your bodily system is in homeostasis, at least, as far as blood glucose is concerned.

If too much sugar or starch is consumed (all starch is converted straight to glucose as soon as it arrives in the intestines), the hypothalamus will continue to boost the insulin level in an attempt to bring it down. Eventually, the insulin pedal is to the floor. The insulin

level reaches a maximum and can no longer clear out the excess. The glucose level then goes up, up, and up. Sustained high levels of either glucose or insulin are bad for you. How much sugar/starch will trigger this overload situation? This varies from person to person, but a couple of bagels and a glass of orange juice would run the sugar up for several hours for a lot of people. During this period of time, they would no longer be in homeostasis. Many people eat a high-carb diet, and their sugar level is out of homeostasis much of the time. The hypothalamus is still trying to control things, but its ability to do so has been swamped by the excess sugar. The sugar hill is too steep. Glucose is too high, and insulin is kept high to try to deal with it. With adult onset diabetics, both these levels are too high 24/7.

We will be referring to input, output, controller, reference or set-point, and monitor later. Here's a little review in chart form:

Activity	On the road	Eating bagels
What is to be controlled	Speed	Blood glucose level
Reference or set-point	74 mph*	74 mg/dl
Output	Speed of car	Glucose level
To be overcome	Hill	Excess dietary glucose
Input	Gas pedal	Insulin secretion
Monitor	Speedometer	Glucose-sensing nerves
Controller	Driver	Hypothalamus

*The authors have no idea how much tolerance is given and decline all responsibility for any tickets.

Your body has hundreds of such systems, if not thousands. The key ones are controlled and regulated by the hypothalamus. If homeostasis is attainable—the hill's not too steep—the hypothalamus will regulate the key hormones to optimal levels. There is no need to eat or exercise in some precise way. You only need to manage yourself in such a way that the hypothalamus can "lock-in." This varies from person to person, but can be determined by measurement. One person might be able to eat a lot of starch and still maintain a glucose level of 74 mg/dl. Another person might have to give up starches entirely to achieve this.

The typical modern lifestyle tends to push us into regions where homeostasis cannot be achieved. This allows degenerative disease to gain a foothold. With proper lifestyle choices, this trap can be avoided.

So, in the end, health is managed and controlled to a certain degree of perfection by a neural system we are largely unaware of, with a complexity beyond all description, perhaps forever beyond human comprehension. Whether this came to be by the blind guidance of evolution or was the work of a Divine Hand may be equally unknowable, but whatever the cause, there is something of truly remarkable beauty and awe residing in each of us: as close to a miracle as one can likely get. If there is a corporal soul, it surely resides therein.

Dr. Mike's Philosophical Sidebar

Belly Be Gone!

There are different kinds of fat. The first kind is fat under the skin; the second is inside the muscle layer, and is also know as "mesenteric," "visceral," or "organ" fat.

The inside fat is toxic and both related to and causative of many kinds of metabolic diseases like diabetes, high blood pressure, osteoporosis and stroke: bad stuff. It makes us look funny in a Speedo too.

Now, surprisingly, even skinny people can have a lot of this "beer belly fat." I used to call such people "skinny fat people." Some better diplomat than I dubbed them TOFI: thin outside, fat inside. Same thing. Still bad.

Genetics is always at play, but this is mostly a behavioral problem. The sad part is that conventional exercise can actually make the problem worse. You can grind away on the treadmill and get fatter. Really? Really!

This is where the old confusion about "calories in, calories out" comes into the picture. There are two elements to this:

1. What the calories do to your own hormones is much more important than the calorie count and it is the hormones that determine if the calories are stored or burned. Eat the right calories and they are literally metabolized away. Eat the wrong calories and they wind up as seat pads.
2. The second element is the exercise aspect. Simply burning calories in the wrong way can actually increase the body's tendency to store them. Conventional aerobics does this neat storage trick very nicely.

I remember many years ago, in my own endurance aerobics phase, being amazed at the number of beer-belly-bearing pretty good runners I would see at various 10K and marathon venues. It was years before I finally understood.

It doesn't much matter about your family history or your personal fat history; what matters is it is all largely under your control.

PREVENTION AND REPAIR PROCESSES

Many prevention and repair processes are distributed throughout the body, while others are centrally controlled. Almost all the centrally controlled ones are managed by the hypothalamus. If this little computer-like brain is allowed to function properly, it will set up the conditions that prevent almost all degenerative disease.

The 70% that are suffering and dying from these diseases are, in various ways, confounding the operation of their hypothalamus. If we change our ways so that the hypothalamus deals with a situation it is familiar with, one it has seen before in its millennia of evolution, these diseases won't occur, or, if they are already occurring, they will be halted or even reversed.

Since we cannot know our ancient ancestry, we cannot know in advance which lifestyle choices will work, but this can be determined from measurement, and is the topic of PART II. The measurements are blood tests and scans. Far more information is gathered than in a typical annual physical. This is the Quantitative part. This greater amount of information very exactly describes your current state of health, and quite accurately predicts where you are headed. The majority of us are headed in an unhealthy direction. Quantitative Medicine suggests changes to rectify this.

Quantitative Medicine is unique in having no standard advice. People are too different for that to ever work. Quantitative Medicine differs from other medical philosophies or disciplines in two important ways:

1. **We know how measurements relate to health.** This is the result of Dr. Nichols's 20-year practice of Quantitative Medicine. Using these measurements, one can develop a personal health strategy and, in some cases, embark on a cure to existing disease.
2. **It actually works.** The methodology has been applied by Dr. Nichols over the last 20 years, and has altered the lives of several thousand people—dramatically for many. Not a single person got worse.

This book is intended to complement standard Western medicine, not replace it. Indeed, if a degenerative disease has already struck, a heart attack or cancer, for instance, Western medicine is by far your best chance of recovery and survival. These sorts of interventions are where it shines.

This book aims largely at preventing such maladies in the first place, and its methodologies have already proven very effective for the people who have practiced them. We suggest you fully consult with your doctor should you decide to try the recommendations and methods in this book. However, don't let your doctor malign the methodology without good reason. Other things being equal, this book can save your life.

Much medical research today addresses these "modern" diseases. The

maladies that were killing us 100 years ago have largely been slain, mainly through medical breakthroughs, but also through improved sanitation and food standards. Cholera, for instance, is caused by contaminated water, and is really a civil engineering problem. Deaths associated with childbirth, once common, have been greatly reduced. Life-threatening childhood diseases are all but gone. People now live longer. Long enough to get the diseases of our age: heart disease, cancer, adult onset diabetes, Alzheimer's, and the rest. Medical research has been on the attack on many fronts. The War on Cancer, declared by Nixon in the '70s, is one such example. (Not a war we're winning, by the way.)

A fundamental difference with these new diseases is the absence of pathogens: bacteria, viruses, and other invaders. We are inflicting these diseases upon ourselves, starting in childhood. In this book, we are going to explore how we are doing this, and what can be done about it. Everything will turn out to have a reason, almost always rooted in survival.

Key Points

2 - Health Is Controlled

- Every attribute we possess is there because it improved our survival chances.
- Anything "new" had to pay for itself: it had to provide a greater benefit in terms of survival than it cost in terms of energy (food).
- The hypothalamus controls most essential repair and renewal processes. It controls major organs. It is survival oriented.
- The hypothalamus maintains a precise list of ideal key hormonal levels.
- The hypothalamus will tightly regulate these.
- The hypothalamus still thinks we are hunter-gatherers and that food will frequently be in short supply.
- If the hypothalamus decides to economize, repair and renewal are shut down to save energy, and degenerative disease progresses. The hypothalamus frequently reaches this conclusion.
- If the hypothalamus thinks you are successfully hunting and gathering, it turns on repair, renewal, creativity, disease prevention and so on. We want this.

3 - ATTAINING PEAK HEALTH

Peak health, the condition where degenerative disease is halted, even reversed, has two components, ideal homeostasis and anabolism. To achieve peak health, these two need to occur frequently. Ideal homeostasis means the body is in a healthy enough state to be capable of performing repairs and fighting disease. Anabolism means that it is actually doing so.

IDEAL HOMEOSTASIS

Your hypothalamus will attempt to regulate numerous circulating hormones and biochemicals. Regulate means driving the levels to specific targets or set-points. Regulation of glucose was discussed extensively in the last chapter. The targets or set-points that the hypothalamus uses are tucked away internally. We are born with these numbers already set, though many of them slowly vary over the course of our lives. If the hypothalamus is able to do its job, all the regulated biochemicals and hormones will be at the same level as their targets. But what are these target levels exactly?

If we knew someone was in homeostasis, we would need only measure, with blood tests. But unfortunately, we don't know when someone is in homeostasis. There is no little green light that goes on to tell us.

The way out of this conundrum stems from observation: for almost all people, the ideal homeostatic set-point or targets are very nearly the same. Using the data from several thousand patients, Dr. Nichols

was able to deduce the ideal ranges. He observed that if someone was sick, did the Quantitative Medicine protocols, and got well, their blood measurements almost always ended up in certain narrow ranges. So we call these the ideal ranges. There is strong confirmation for this: the hormonal numbers we have from hunter-gatherers, be they Inuit or desert bushmen, fall into these same ranges. So at this point, there seems to be a very strong case that these ranges are the ideal ranges, and that they apply to all of humanity.

The ideal range for fasting glucose is between 60 and 80 mg/dl. Since we don't specifically know the level of your own target numbers, we make an assumption, a strongly justified one, that the target number is in the ideal range and the hypothalamus will adjust to this *if it can*.

A given individual's set-point might differ, and his hypothalamus could be targeting some number outside the ideal range. This happens, and has turned up in Dr. Nichols's data, but it is fairly rare. We really don't know if this oddball number is, for some reason, ideal for that particular person. We think that it is not, and that the hypothalamus has goofed, or has gotten pulled off track by a long period of bad lifestyle choice, but we don't know that for sure. The following section has a couple of examples.

The Quest for Ideal Homeostasis

Suppose that for some period of time, a person had a lifestyle where regulation was impossible: perhaps a period of high stress, or of no exercise, or a diet which caused a slow but steady weight gain or blood pressure increase. Measurements can be made. Some of these measurements will probably be out of the ideal homeostatic range. Let's suppose fasting glucose is measured and is high: 110, say. Likely cause: too much sugar or starch. We already know that we want it at 74 mg/dl. Actually, anything from 60 to 80, the ideal fasting range for glucose, would be fine. The reason our "patient" has a glucose level of 110 is because she has made the "glucose hill" too steep. Try as it might, the hypothalamus cannot reduce that glucose into the ideal range. So what should she do to help the hypothalamus out? There could be many strategies, but cutting out starch and sugar for three months would be fast and effective. She can then re-measure, and perhaps she will find that her fasting blood glucose is down at 77 mg/dl. That is a big win. She can infer, with considerable confidence, that her particular

homeostatic reference point for fasting glucose is around 77, which is in the ideal range. She is now able to regulate properly, and is achieving ideal homeostasis, at least as far as fasting glucose is concerned. She has quantified her personal glucose level, along with its ideal set-point, and has gained knowledge on how to attain the ideal. She could experiment at this juncture and see if she could get away with a bit of sugar or starch. Possibly, she could, and still have her glucose regulate at 77.

This is the whole idea. The hypothalamus will be able to lock-in and regulate over a fairly broad span of nutrients and physical activities. Just get into the "ballpark" and the hypothalamus will do the rest. There is no need to hit some precise sort of target. The big problem for many of us is that we are outside the zone where the hypothalamus can lock-in. However, for most people, getting into a region where the hypothalamus can regulate properly is quite possible.

Sometimes, the picture isn't quite that tidy.

Possible problem #1: Tiny homeostatic range. Here, the person can drive himself to the ideal range, but it doesn't hold very well. A modest bit of backsliding and the numbers immediately start to go askew. This could happen with age. Cells are not as vigorous and supple as they once were. Self-discipline will be needed to keep the numbers in the right range. There is a bright side. Making all of those changes will greatly improve cellular health, which will, in turn, help regain some of that lost flexibility.

Possible problem #2: A number goes partway toward the ideal and then sticks. It may be the case that some kind of set-point was reached, but one not in the ideal range. Maybe cutting out starch and sugar moved fasting glucose from 140 mg/dl (a dangerous level) to 110. If that 110 persisted for years, it probably means that it is a homeostatic set-point, though clearly not an ideal one. This is unusual, but not unknown. The set-point may stay there forever. Or it may, over time, creep toward the ideal range. In either case, the "treatment" for both of these problems is the same: Cut the glucose (sugar and starch). Keep pushing it toward the ideal.

ANABOLISM

Achieving ideal homeostasis is only half of the story. To get well and stay well, we need to get our body into an anabolic mode. Anabolism is the

building, repair, and renewal of the body. The opposite of anabolism is catabolism, which is the tearing down and disposal of the old and worn. Normally they work in turns: catabolism clears the terrain and anabolism builds anew.

But anabolism doesn't just automatically occur. Even though the body is in a state of ideal homeostasis, and is ready to renew, repair, and repel disease, nothing will happen unless the hypothalamus also declares, in effect, that the body is *allowed* to go ahead and do so. It is that direct. Cells needing repair will sit and wait for a hormonal signal from the hypothalamus to go ahead. We obviously want all those healthy renewal processes occurring. Why would the hypothalamus curtail them?

The hypothalamus puts a high priority on conserving energy for possible lean times. Unless you are actively hunting and gathering, it will conclude that food is going to be scarce and will start economizing. All those desirable healthy processes use energy, and the hypothalamus is still managing our energy expenditures by the same stingy rules worked out over the last several hundred thousand years. Economy is always its reaction to uncertainty. It has barely begun to adapt to our modern lifestyle.

So how can we get the hypothalamus to stop this scarce-food nonsense and enable the healthy restorative processes? You would think that getting regular meals would convince it. This helps, but it's not quite enough. You also have to prove that you were doing something to *deserve* those meals. The hypothalamus requires, in effect, that you were hunting and gathering. Otherwise, it thinks the food was just some temporary store and will soon run out.

Of course one method of jump-starting the desired repair processes would be to simply become a hunter-gatherer. However, some of us may feel we don't have the requisite skill set, and have perhaps become very fond of our modern creature comforts. Is there any hope for us then?

As it turns out, it's enough to do physical activities that resemble hunting and gathering. The hypothalamus will enable the renewal and repair if it detects this. We are saved!

A nice place to perform this pseudo hunting and gathering is at a nearby gym. Such activities could be done at home, or even in the great outdoors (if you want to get closer to the real thing). But whatever the locale, convincing the hypothalamus that you are hunting and gathering is a little tricky. The

type of exercise is very important. Exercises that look like *migration* will cause the hypothalamus to again conserve and curtail repair and renewal activities. Why? Because migration usually means that the current location has no more food available, so the hypothalamus is again confronted with a scarcity situation. And what might the hypothalamus interpret as migration? Aerobic exercise fits the bill to a tee. And it is easy to see why: it's a long, moderate, and sustained activity. Ditto brisk walking and golf.

Medical Drill-Down Sidebar

How Does the Hypothalamus Know What We Are Doing?

The hypothalamus make some major decisions based on its perception of near-term food availability. Specifically, if you are hunting, it expends energy (a situation we want). If you are migrating, it conserves, and turn off the repair and renewal processes. But how does it know this? The answer is amazing.

The hypothalamus has a huge network of specialized nerves that detect this and that. Some detect glucose level, some body temperature, and there are some that can detect types of muscle movement. The hypothalamus knows if you are using your muscles, and also knows how you are using them: is it concentric or eccentric movement?

In concentric movement, the muscle is working while shortening. In eccentric movement, the muscle is working while lengthening. Most exercise involves both in turns, but one type usually predominates. If you are about to spring on an unsuspecting gazelle, you crouch very slowly (lightly eccentric) then spring with all your might (explosively concentric).

Walking, though, is largely eccentric. For each step, you effectively fall forward and catch yourself. The catch is the main energy expenditure and is primarily eccentric. Walking is very efficient. We are "designed" to migrate without expending much energy. Good thing, no doubt.

So concentric means hunting. Food supply assured. OK to expend energy. Eccentric means migration, searching. Food is not assured. Conserve. Shut down processes that can wait.

Does this mean that aerobics, the doctor-recommended, ideal-in-every-way exercise, the one peddled and pushed for three decades, actually thwarts the body's inherent repair and renewal system? Sorry folks, but that does seem to be the case. That sort of exercise will cause the hypothalamus to turn down the desirable repair processes in order to save energy. Aerobics are far better than sitting on a couch, to be sure, but fall far short of initiating the processes we need to effectively combat degenerative disease.

The type of activity that causes the hypothalamus to turn on anabolism and launch the various repair and renewal processes is exercise of an intense explosive nature. Brief and intense. Exactly the sorts of activity that go on in ancient hunting. Hunting with spears, clubs, stones, and the like.

This is not speculation on our part. Tests after tests have proven that high-intensity interval exercise, as it is now known, will provide far more health benefits than aerobic, and in far less time.

There is still plenty of aerobic exercise going on at most gyms. We find it tedious and would far prefer something strenuous that lasted only a minute or so. But we are getting ahead of ourselves here.

Metabolism = Anabolism + Catabolism

Medical Drill-Down Sidebar

Is Glucose Always Bad? Isn't Glucose Necessary?

Some people can deal with glucose without any problems. However, this ability diminishes with age. The principal sources of glucose are sugar and starch. Many, perhaps over half, of those over 50 have some degree of difficulty metabolizing the sugar and starch they are currently consuming. Recall that our hunter-gatherer ancestors got very little of either. In our long pre-agricultural history, we had correspondingly little opportunity to evolve or adapt any effective strategies for dealing with them. On the grand evolutionary scale, 10,000 years simply isn't long enough to make that leap. Further, sugar is strongly implicated in the big four degenerative diseases: heart disease, cancer, adult onset diabetes, and Alzheimer's. It plays different roles, but it is always found lurking at the scene of the crime. Dietary fat isn't implicated in any of these diseases, and that includes saturated fat (but trans fat is indeed bad news—avoid). The body is all set up to deal with fat. Protein is innocent as well.

Unregulated glucose levels invariably have long-term consequences, especially if coupled with high insulin, and unfortunately, this is a pretty easy situation to slip into.

A certain level of glucose is necessary, and you may wonder where that necessary glucose is going to come from if a person eats no sugar or starch. Actually, there will be plenty of glucose available in non-starchy vegetables, and we recommend eating a fair amount of those. The glucose from these is digested slowly, and usually does not cause an overload.

The body even has a system for dealing with a complete absence of carbohydrates. If a person, an Atkins dieter for instance, eats no vegetables at all, their body will make glucose from protein and fat. This likely won't be enough, but the body has yet another trick up its sleeve. It has a substitute for glucose called ketones. The liver makes up ketones from fat, and any organs that need glucose, especially the brain, will do just fine with this ketone substitute.

WHY AREN'T WE NATURALLY IN IDEAL HOMEOSTASIS AND ANABOLISM?

We "naturally" are. We are quite well equipped to deal with all that life threw our way when we were "at one" with nature. In fact, we are well equipped for many different sorts of natures, from the arctic to the desert to the jungle. And this was everyone's lot until very recently. Very recently in evolutionary terms, anyway.

And we didn't just survive, we thrived. The capabilities of our direct ancestors tell us that we are easily able to deal with all this variety and difficulty. We have a proven hypothalamic versatility, if you will, and in those vastly different environments, we were in ideal homeostasis, were often anabolic, and, importantly, we didn't get degenerative disease.

An entirely different situation arises if the hypothalamus is strained or pushed so that most of the time it cannot regulate to the ideal range. It can then no longer control and regulate the various hormones and other critical levels. Things stop working. Biological infrastructure is broken down: Health deteriorates. Renewal and repair are curtailed, and degenerative disease is not pushed back. Worse still, the hypothalamus usually interprets all the confusion as a cause for conservation, and further pushes the body into an energy-saving catabolic state: just what we do not want.

Starting 10,000 years ago, we began making a series of changes that would bring all those undesirable changes crashing down upon us. The agricultural revolution had the net effect of pushing our hypothalamus out of its normal equilibrium, and into a place where it could no longer regulate and operate properly. And worse, it pushed it into an energy conservation state as well. The early agriculturists (the elite excepted) lived almost solely on grains and other low-quality, mass-producible foods. And seldom enough of even that.

This was a health disaster without precedent. There have been archaeological digs where skeletons were found from both early agriculturists and nearby hunter-gatherers, and the difference is dramatic. The hunter-gatherers were several inches taller, more robust, non-arthritic, had better teeth, and were generally a lot better off. They likely worked less, too. At least

today, hunter-gatherer societies typically spend only three to five hours daily obtaining their immediate needs and use the rest of the time, well, playing. We don't know what the ancient farmers' schedules were, but doubt they were leisurely. The health and durability advantages the hunter-gatherers had over the have-nots of the agricultural society (almost everybody) would persist until the 19th century. On the basis of degenerative disease, you could argue that it persists still.

The agricultural revolution didn't happen overnight. It spread slowly, and many of us remained hunter-gatherers for several thousand years. Perhaps as recently as 1,000 years ago, half of us still were. All of the Americas were. At the dawn of the 21st century, a few tribes still remain. They may be the last.

Given the huge variation in hunter-gatherer cultures, it should come as no surprise that humans have a wide genetic diversity, especially metabolically. This has both benefits and drawbacks. One major benefit is that we can thrive on a huge variety of diets, with the significant exception being our Western one. The disadvantage of all of this diversity is that we are all quite, one could say, diverse. This isn't bad in and of itself, it simply means that we cannot know in advance how we will respond to changes in diets or exercise patterns. Determining this is where Quantitative Medicine comes into the picture.

Ask Dr. Mike

The Value of Fasting

Q: As the hunter-gatherers seemed to have either "feast or famine" and you claim that this is our evolutionary and genetic legacy, why don't you include fasting in your dietary advice?

A: The answer to this has more to do with clinical experience than the evolutionary anthropology underlying most other advice. It has been my experience that most people engage in compensatory eating behavior when they attempt a fasting regimen: they wind up eating more and worse food than when they eat on a regular basis. Besides eating poorly or too much, eating all of the time is another way to fail and thus "grazing" suppresses some of the advantages of the intermittent eating of regular meals and snacks. Eat every three hours but do not graze.

THE KEY TO A LONG, DISEASE-FREE LIFE

Achieve ideal homeostasis and anabolism, at least some of the time, and the good life is your. You will look healthy, feel healthy, and be healthy. The risk of degenerative disease will be low and aging will be slow. The rest of the book is about why this is, and how to meet the requirements without joining

a hunter-gatherer band. Quantitative Medicine will lead you to this ideal state. Though the degenerative diseases are different, they share a common cause. And a common cure. In these senses, they are all interrelated.

Difficulties Meeting the Ideal Homeostasis Requirement

Here is a list of lifestyle attributes that tend to push the hypothalamus out of ideal homeostasis:

- Chronic consumption of sugar and starch
- Lack of sleep
- Chronic stress
- Chronic overeating
- Irregular sleep, irregular circadian rhythms, artificial light
- Sedentary lifestyle

These are all prominently featured in our modern civilization, but mostly absent in the hunter-gatherer's world.

Stress could be a frequent component of the hunter-gatherer lifestyle. Of course, if there is a saber-toothed tiger lurking in the cave, the stress response is appropriate, but one way or the other, that situation is transitory. But chronic stress? We really don't know.

Chronic stress is very unhealthy. The immune system is suppressed, repair put on hold, inflammation increased, mental acuity decreased, and excess food stored as fat. All in all, very undesirable.

Nowadays, for many, the day-to-day coping seems to be a cause of chronic stress.

Difficulties Meeting the Anabolic Requirement

There are two lifestyle features that cause the hypothalamus to enter and remain in a catabolic state, thus suppressing renewal and repair:

- Sedentary lifestyle
- Chronic stress

Sedentary lifestyle has already been discussed. The hypothalamus thinks you are unable to hunt, so it conserves. No energy-consuming anabolism is permitted.

Less clear is the reason for the anabolic shutdown in the presence of chronic stress. The stress response, again managed by the hypothalamus,

consists of shutting down processes that can wait, and that would include energy-consuming anabolism.

We now know where we want to be. We know also how to determine where we are. The step-by-step procedures that will be developed in PART II explain how to make the transition. It's a question of willpower, coupled with an awareness of what is going on. We'll supply the latter; the former is up to you.

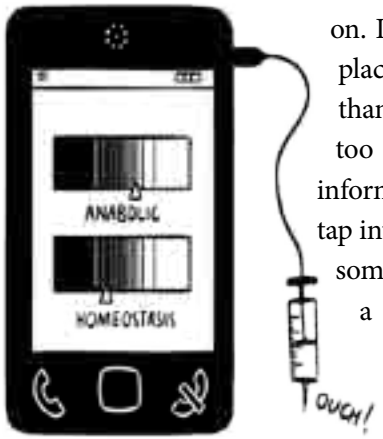
Key Points

3 - Attaining Peak Health

- If the hypothalamus cannot maintain the regulation of the key levels, the body may be in a perpetual catabolic state. Renewal does not occur; aging is rapid. Degenerative disease advances.
- Various lifestyle choices can get the body into the range where the hypothalamus can achieve ideal homeostasis.
- The agricultural revolution presented a nutritional and physical situation that thoroughly confounded the hypothalamus. The net result was a huge deterioration in health of the agricultural populations.
- The key to a long disease-free life is to present the hypothalamus with a lifestyle that causes it to engage its vast repair and renewal capability.

4 - QUANTITATIVE MEDICINE: MEASUREMENT AND MODIFICATION

You cannot know whether you are experiencing the benefits of ideal homeostasis and frequent anabolism without measurement. You may think you know, which could add to the problem. You may feel fine, but if your hypothalamus is out of balance or overloaded, there will be underlying processes heading in undesirable directions. Since this cannot be known directly, it is determined and quantified by testing. This step is necessary and the results are frequently surprising. Some things needn't be worried about, but others should be dealt with.



ILLUSTRATOR'S NOTE: THE HOMEOSTATIC WATCH HAS BEEN REPLACED BY AN APP FOR ACCURACY.

Your hypothalamus knows exactly what is going on. It gets continuous measurements from many places in the body, which is far better information than the occasional fasting blood draw. It is too bad we have so little awareness of all this information. It would be very convenient if we could tap into this hypothalamic information center with some yet to be imagined medical gadget: perhaps a nifty hypothalamic wristwatch. There could be a little dial that indicated anabolic (green) and catabolic (red). It would go well into the green when you exercised. Another dial would indicate homeostasis. It would go into the red if you ate a cheesecake or got stressed out. Such a gadget could have

quite a beneficial effect on our behavior, as we would be getting immediate feedback on our actions (or inactions).

Back here on terra firma, we have no such gadget (yet), but we can measure and quantify these things, it's just not as convenient and is somewhat indirect. However, it is absolutely necessary to do this if you want to develop the healthy habits and practices that will reap the innumerable benefits of ideal homeostasis and anabolism.

Ideal homeostasis means the hypothalamus is able to keep the various hormones, nutrients, and biochemicals regulated in their proper zones. Since these biochemicals circulate in the blood, they are readily measured with a blood test. Anabolism can also be measured this way.

If you are over 40 or have a family or personal history of heart problems, you should also get a scan to measure heart calcium and bone density.

Blood tests and scans will define your health just as well as our hypothetical hypothalamic wristwatch. If you change your lifestyle, you will change these measurements, and that will mean your health has changed as well. This is the fundamental reason Quantitative Medicine works so well.

MODIFYING YOUR HEALTH TRAJECTORY

Although it is difficult and perhaps dangerous to meddle directly with the functions of the hypothalamus, it is fair game to push it in a desired direction by consciously controlling the energy supplies and demands. The hypothalamus looks directly at these to reach its energy management conclusions. To modify our health trajectory, we need to get our hypothalamus into ideal homeostatic and anabolic modes. This is both a communication problem (what does it want us to do?) and a problem of execution (are we willing to do it?).

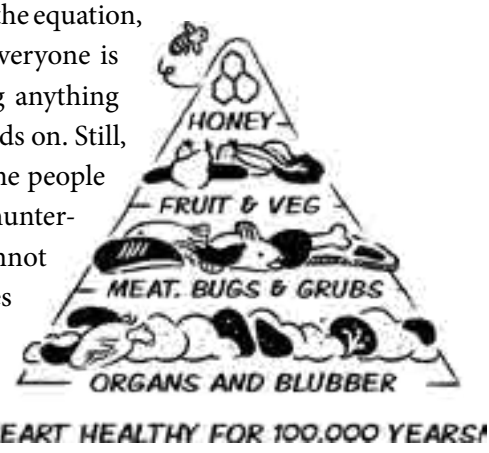
The hypothalamus is a very old system. It evolved well before much was going on in the way of brains, and there isn't a lot of mental connection with our neocortex, at least not the conscious part. Watching sports on TV isn't going to convince it of anything. However, any sort of physical motion that might actually be involved in hunting or gathering would be a valid signal.

Imagine what our hunter-gatherer ancestors were doing to try to get food. They could be shoving boulders onto an unsuspecting mammoth or

charging a buffalo. These animals might equally be chasing them. This is explosive stuff: stalking, stalking, and then in for the finish. Further, that meat's got to be dragged back to the cave or igloo. More work. On the way back, the local wolf pack might take some interest in the spoils. More activity, likely vigorous.

Can this be done at the gym? Fortunately for us, the hypothalamus really can't tell the difference. Cook up some explosive and strenuous, but brief, exercises, and the hypothalamus is likely to conclude hunting season is on and there is no need to conserve. Typically, a couple of vigorous 45-minute sessions a week will accomplish this and set the hypothalamus into the highly desirable anabolic mode. Two short, intense sessions represent a huge time saving over the typical five-hour-per-week aerobic sessions often recommended., but they do need to be as intense as you can manage. Intensity is far more important than duration. Will this work for you and do you even need to do it? It definitely works, and you probably need it, but measurement is the only way to tell for sure.

Exercise is the "energy-out" piece of the equation, but what about "energy-in?" Again, everyone is different. A safe bet is to avoid eating anything hunter-gatherers couldn't get their hands on. Still, this varies from person to person. Some people do fine with starches (rare in the hunter-gatherers' world), while others cannot metabolize them well, which causes their glucose and insulin levels to soar, leading to disease vulnerability and unhealthy weight gain. The measurements reveal this too.



The hunter-gatherer diet is not necessarily a healthy one. Intestines (full of parasites) or scavenged meat (don't even know where to begin) are obviously quite dangerous. However, bad meat or starvation is a choice most of us don't have to make.

It turns out that today most hunter-gatherer societies are consuming 60-90% animal product. This is probably what we are "designed" to do. This doesn't mean some can't do well on a vegetarian diet that includes eggs and dairy products, but they are possibly bucking the system. Vegan

is another story. A lot of supplementation will typically be needed to avoid serious health issues.

Eat things that the body, in its evolutionary past, has seen before. Pastured animals are healthier than feedlot animals. Organic vegetables are better. Sugars, starches, cereals, breads, and so on were not even on the Paleolithic menu. Again, some people do fine with these and for others they are practically toxic. This can be quantified by measuring.

The meats (here including fish, fowl, dairy, and eggs) and vegetables also have essential micronutrients. You have already heard of these as minerals, vitamins, and the like. You need to get a reasonable amount of these micronutrients, and just about any sensible mix of meats and vegetables will do. Starches and sugar come up quite short in this area. Sugar has none. Starches have little to none. You can survive on sugar and starches, but cannot thrive. This was probably abundantly clear any time a hunter-gatherer troop opted (or was forced) to join the grand agricultural revolution, but in the ensuing years this has been largely forgotten.

STACKING THE ODDS IN YOUR FAVOR

Risk is chance, not certainty. However, the tendencies are there, and if the numbers are not in the right ranges the diseases are pretty likely to be advancing, particularly heart disease. That said, we want to go:

- From destruction to renewal
- From catabolism to anabolism
- From accelerated aging to slow aging
- From disease to health

These are all really the same thing, and everything is regulated and centrally controlled by the survival-oriented hypothalamus. If ideal homeostasis can be achieved and anabolism started, these fall into place.

Anyone with the will to do so can accomplish this. The hypothalamus isn't really in charge, it's just running things in your absence. Armed with the knowledge of how it reacts, and the will to change what it reacts to, you can take over. It's entirely up to you. However, to effectively exercise this will, you need to know your genetic and biologic predispositions. Otherwise you will likely fail. Cutting this metabolic Gordian Knot is what Quantitative Medicine is all about. It supplies the focus and specificity necessary to pull it off.

Health as a Business Proposition

Are you an investor? Or a gambler? Both? (For many they are the same thing.) If so, consider this investment proposition: undertaking this program can reasonably add 10 good years to your life. Maybe more. Consider it 33% from diet, 33% from exercise, and 33% from de-stressing. Just guesses here. Which component is more important depends on the individual. For our hypothetical "Judy," it's 33-33-33%. She started optimizing all these at age 55 and added nine healthy years to her life, cashing in at 95. Let's compute some returns on investment.

Judy has to eat, so a diet that is optimal for her specific metabolism gets her three years right off. That was practically free.

For exercise, we typically recommend two strenuous 45-minute sessions a week. Judy starts doing this at 55. Forty years later she will have exercised 3,100 hours. That's a lot of sweat, but timewise, it's slightly over four months. What did she get for that? Three more years. That's a pretty good payback. That works out to about 7 hours of additional healthy life for every 45 minutes of exercise, a 9:1 payout. So even if you hate exercise, this is a really good investment.

Stress is a huge part of modern civilization, and entering the program, Judy was a bit of a stress-ball. She got this under control and added another three years. For Judy, this required a daily 10-minute meditation like

activity. Thus Judy got around 12 more hours of additional life for the 70 minutes of weekly stress reduction activity. The payout here, an impressive 11:1, even beats exercise.

There is a catch: You can't just do one thing. The body is too interconnected. All three are necessary.

Here are six-month results from 25 Judies and Joes:

These are the first 25 people who began a program Dr. Nichols launched in 2001. These are stunning results. These people's health has dramatically improved in a very short time. There were no drugs used to achieve these results. In fact, any drug that could achieve anything remotely similar would be the blockbuster of all blockbusters.

Do you want to go ahead and do all this? If so, there's PART II, which spells it all out, step by step, and PART III, which explores the underlying science. If you've had enough, here are four pieces of advice that should make a difference. You may or may not need to do any of these things, so this is not "standard advice." Measurement is the only way to be sure; this is the essence of Quantitative Medicine. However, these items may help and will definitely do no harm:

1. If you seem to be gaining a pound or two a year, cut down on sugar and starch. Or cut them out entirely. They are the most likely cause of that weight gain. Most of us are not well designed to deal with sugar or starch. Don't worry about meat, fat, or high-cholesterol foods. Try to eat two to three times as much vegetables as protein (meat, eggs, cheese). Eat snacks between meals. Eat

colored vegetables and vary your meats. For fruit, eat berries, or better still, nothing: fruits are loaded with sugar. Eat nuts. Buy organic when you can.

2. You *should* exercise. You already know that. However, quality trumps quantity. Do explosive stuff. Run your heart up and down. (See a doc first if you have *any* reason to suspect heart problems.) What's explosive? Instead of swimming for an hour, swim like mad for 30 seconds, rest 2 minutes, repeat 5 times. Jogger? Change to the same sort of pattern: 30-second sprint, 1 minute walking. Don't do the one-hour swim or 5-mile jog. Do some resistance exercise too. If you are over 50, be sure to include squats and deadlifts. This and only this prevents and reverses osteoporosis. Two hard 45-minute sessions per week will reap huge rewards.
3. Reduce your stress level. This may be the most important point, and it is certainly the one most frequently ignored—a huge mistake. Chronic stress is very unhealthy, far more so than is generally recognized. Chronic stress contributes more directly to a degenerative disease state than either poor diet or lack of exercise and further, is often the cause of both of these. Do what you can to minimize the stress of your day-to-day life, but take it a step further. Give your inner voice a chance to be heard. What inner voice? Well, maybe your hypothalamus, or some other inner consciousness. Your soul perhaps. Here is how: Stop the constant thinking and chattering of your conscious brain. Simply think of nothing at all. This is a lot easier said than done. Once you begin this, your conscious brain will soon restart the chatter, rudely taking over. The trick is to start with short targets. See if you can shut the brain-computer-chatterbox up for 30 seconds. Or 15. Try to work your way up to 10 minutes a day. This activity could be called meditation, but no need to label it. Don't put on saffron robes or bother with the lotus position. Just get comfortable and shut the chatter down. This will accomplish a lot. Meditative activity is known to reduce stress, cortisol, and inflammation. This boosts the immune system, which helps push back cancer, but the effects seem to go much further. Things change for the

better in numerous other subtle ways. Try it. Above all, do what it takes to get your stress level down.

4. Tune in to your circadian rhythms. Our Paleolithic ancestors were locked into the hours, lengths, and colors of the days. This foretold the coming seasons and initiated the substantial metabolic changes needed to survive them. Did we know how to hibernate back then? Not exactly, but we certainly have many of the requisite abilities. A long and severe ice-age winter requires an ability to quickly store a lot of fat and to down-regulate energy expenditures. Does this ring any bells? It likely still rings a few in our hypothalamus, which has these expectations hard-wired in. If we violate them, are there consequences? The is surely the case. Seasonal Affective Disorder is connected to this, and shift workers have significantly higher rates of cancer. In any case, sleep well. Quality sleep is best. Seven *solid* hours is probably enough. Nine is even better. Be sure to make it dark and quiet. Tape over all those red lights from your electronic gadgetry. Perhaps your sleep patterns do need to vary with the seasons. Pay attention to sleep. A lot of repair and renewal goes on during sleep. Make it count.

Do you need to do these things? We don't know and neither does anyone else. We suggest them because first, they are common problems, and second, they won't hurt you. No one needs sugars and starches. Exercise is universally beneficial, and quieting your mind is always healthy. If you want to refine this, you can get a lot more benefit, but you will have to measure and go from there. That is the topic of PART II and PART III.

GUIDE TO THE BOOK

Hopefully, PART I answers the "what" of Quantitative Medicine.

There are two more principal parts:

PART II - USING QUANTITATIVE MEDICINE (the "how")

PART III -THE SCIENCE OF QUANTITATIVE MEDICINE (the "why")

You can stop after PART II. Should you go on? Read this paragraph:

> *Life span amongst mammals is generally proportional to weight. Mice live about 2 years and elephants as much as 70. We are exceptions, as are our primate cousins, living longer still. However, there is a very small mammal with a very revved up metabolism that represents a far greater exception. This animal is lighter than a mouse but consumes several times as much food daily. Whereas a mouse may live 2 years, this animal—the common bat if you haven't already guessed—lives 25. What is the bat's special trick? Well it's not the 100% bug diet, it's flying. Flying means being able to summon up a huge burst of energy. This means a very modified metabolism, and this modification also gives the bat (birds too) an extraordinarily long life for its weight. The modification lies in tiny sub-cellular organelles called mitochondria. These organelles were once free bacteria and were enslaved by our single-celled ancestors perhaps a billion years ago. Mitochondria still have their own DNA. They create energy from glucose and fat. The more mitochondria you have, the more energy you can conjure up, and the slower you wear out. We all have some mitochondria, but bats have a lot more. This has serious implication for us. If we can improve our mitochondrial function, it can have a profound effect on….[and so on]…*

Now take this "quiz": Did this interest you? Could you follow it? Then read PART II and then go on to PART III. No advanced degree required. B's or better in high school science and an inquisitive mind are useful, especially the latter.

Did this seem like a needless digression? Would you rather get straight to the point? Do you have better things to do? Then just read PART II, which won't be diving as much into technical detail. This is not to say it is in some way easier or dumbed down, just less technical.

There are also various appendices, including an annotated bibliography of medical research papers.

Quantitative Medicine is a complete medical system for preventing degenerative disease. It began 20 years ago, largely as an investigation into the various reasons standard medicine wasn't making people well. (In fact, in a lot of cases, it was making people worse.) It became a synthesis of what is known about the cause and prevention of degenerative disease.

Some of the material is common knowledge, some has been known and ignored for decades, and some is new. Its effectiveness has already been proven on a diverse cohort of over 2,000 patients. Effectiveness is largely a matter of compliance, which is to say application of willpower, self-discipline, or just plain old-fashioned gumption.

If you are stopping at PART I, thanks for dropping in, and come back if you need to go further. Good luck.

Key Points

4 - Measurement and Modification

- We are too genetically diverse to know our own health.
- A blood draw and full-body scan will elicit considerable information.
- The hypothalamus doesn't know if you are actually hunting, or emulating something like that at the gym.
- If you eat mostly what you, in principle, could have hunted or gathered, the hypothalamus will make good use of it.
- Starches and sugars have little nutritional value and we are ill equipped to deal with them. They weren't in the Paleolithic diet.
- In any case, your health will not deteriorate, and will likely improve, if you 1) cut down on sugar and starches, 2) turn up the intensity of your exercise, 3) undertake a meditative activity, and 4) get quality sleep.