

# Nervous System Health

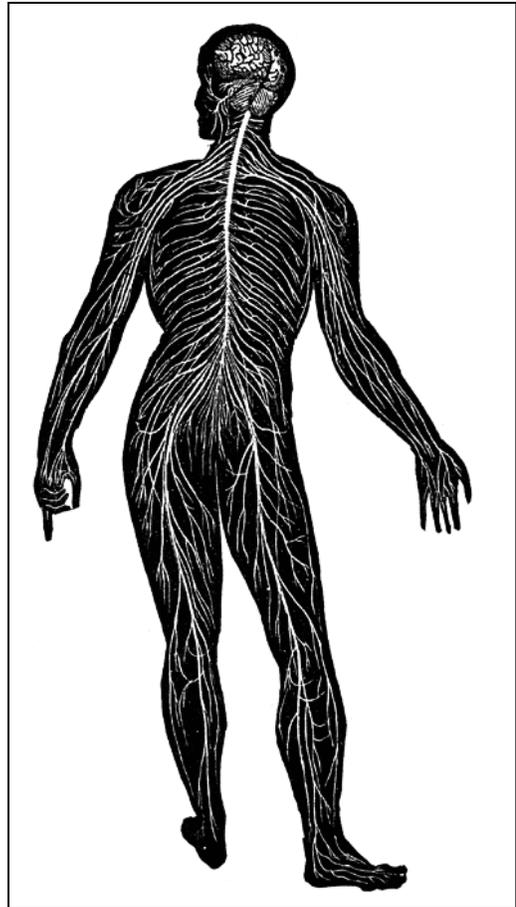
## *Understanding the “Master Computer”*

Your nervous system is a complex network in which the brain serves as the central control unit. I am a trained physician and I am still passionate about the nervous system’s exquisite nature.

Nervous system function is essential to life. It carries the electrical energy and life force that flows throughout the body to all of the tissues, organs, and cells that carry out every bodily function. When this flow ceases, we die. Without it your heart does not beat; nor can you breathe, sleep, or pick up a newborn child.

The nervous system itself is so important that as our bodies begin to form in the womb, nervous system tissue is the first to appear. As a multi-cellular organism, the human body must monitor and maintain a constant internal environment as well as respond and monitor what is going on in our external environment. This is the job of the nervous system, the most intricately organized system in creation. The most intelligent engineers have not even come close to making circuit boards or computers as precise or as powerful as the human nervous system.

As the central controller of your nervous system, the brain sends and receives messages, controls and checks the status of bodily functions and performance, and alters control messages, moment to moment, when it senses such alterations are needed. It does this for every cell, tissue, and organ of the body by controlling hormones, maintaining blood chemistries, and transmitting energy to the places needed. There are an estimated 50 to 100 trillion cells in the human body. When your nervous system is working correctly, it is electrochemically communicating with every single cell—and very quickly. It is extremely intricate and precise in its actions. Simply amazing.



## *How All the Pieces Hangs Together*

The nervous system has two main parts: the central nervous system—which includes the brain and spinal cord—and the peripheral nervous system. The nerves of the peripheral nervous system run from the spinal cord, exit between spinal vertebrae, and connect the central nervous system to every nook and cranny of the body.

The skull, spinal vertebrae, and cerebrospinal fluid protect the central system. Further, protective membranes insulate and cushion the brain and spinal cord.

Certain cells in the nervous system, called receptor cells, sense stimuli such as heat, cold, pressure, and light. The cells then send signals to the spinal cord to convey their “findings.” In turn, the spinal cord passes the signals to the brain.

## The Brain

The brain gathers information from the various receptor cells and decides what it must do, if anything. If the brain determines that action is called for, it sends signals to organs and tissues to carry out the actions that they control. These actions involve such things as movement, temperature change, hormone release, and change in heart rate. Of course, there are many others.

The brain contains many “structures,” but its five main components are: the cerebrum, the cerebellum, the medulla oblongata, the hypothalamus, and the thalamus.

The **cerebrum** mediates intelligence, reasoning, learning, perception, imagination, thought, judgment, and memory.

The **cerebellum** mediates muscle coordination, muscle tone, posture, and balance.

The **medulla oblongata** regulates heartbeat, breathing, blood pressure, and reflex centers such as those for vomiting, coughing, sneezing, swallowing and hiccupping.

The **hypothalamus** regulates homeostasis (the ability or tendency of an organism or cell to maintain internal equilibrium by adjusting its physiological processes). It monitors and normalizes thirst, hunger, body temperature, water balance, blood pressure, and more. It also links the nervous system to the endocrine system via the pituitary gland, where the body’s fight-or-flight response is set into motion.

The **thalamus** serves as a relay station for incoming nervous system messages. In this capacity it is believed to both process and relay sensory information, selectively, to various parts of the cerebral cortex. It also plays an important role in regulating states of sleep and wakefulness.

## The Peripheral Nervous System

The peripheral nervous system consists only of nerves. It connects the spinal cord to the rest of the body. There are two major portions of the peripheral nervous system: the somatic system and the autonomic system.

1. The Somatic Nervous System includes all nerves controlling the muscular system and external sensory receptors. The central nervous system processes input from the PNS and sends responses back through the peripheral nervous system to the organs or tissues of the body. For example, if you were to touch a hot stove, skin receptors that recognize “hot” send signals back to the central nervous system for processing. The message travels up the peripheral nervous system nerve from your hand to your spinal cord and ultimately brain. But before the message gets there, the spinal cord will recognize the signal and its intensity. It has certain, protective “short circuits” built into it called reflexes, and if the stove were hot enough, the spinal cord would immediately send a message back along the peripheral nerve to your arm to “pull back, and fast,” which your arm will do automatically—in a split second. In the meantime, the original “hot” message keeps on track to reach the brain. When it finally does, that’s when you consciously realize what has happened. This is when you actually “feel” the pain and say “ouch.” But your hand has already left the scene of the infraction.
2. The Autonomic Nervous System is that part of the peripheral nervous system consisting of motor neurons that control internal organs and functions. The autonomic system controls the muscles of the heart, intestines, bladder, uterus and more—all automatically, and on a second-by-second basis. The autonomic system insures proper heartbeat, digestion, elimination, menstruation, and so on.

In addition, there are two subsets of the autonomic system: the Sympathetic Nervous System, and the Parasympathetic Nervous System. The Sympathetic Nervous System supports the fight-or-flight response. The Parasympathetic Nervous System supports the opposite—relaxation.

With all the intricate and specialized functions and systems involved with our “master computer,” many stress opportunities arise to help the system to go awry. Nervous system malfunction can occur on a daily basis. The key is to make sure you restore and maintain normal function, and that you make it a regular habit. This supports overall health and wellness for years and years.

## ***What Have I Been Doing Wrong?***

What have I done wrong? How did I get like this? What should I have done differently? The fact is that while we do a lot of things right, our bodies are in a constant state of change. When we perpetuate positive change, support, and enhancement, we sustain proper nervous system function for years. The problem is that the average American lifestyle perpetuates decline, breakdown, and destruction of the body, including the nervous system. The daily rigors of life are enough to wreak havoc on our structural frames. From the work we do to the play that we attempt, we ask a lot of our bodies. Let’s look at three key factors that place our nervous system under attack and get us out of sync: stress, injuries, and chronic pain.

## **Stress**

Our lifestyles are stress-ridden messes on a large scale. We know that 14 million Americans suffer from anxiety and at least 30% of the population suffers from insomnia. Estimates say that 90% of women over 30 suffer from some degree of hormonal imbalance. The causes of degenerative effects on the nervous system due to stress are numerous. It is not just that your husband won’t put the seat down after he uses the toilet. Stress is real, a daily companion.

**This stress list is long and touches nearly everyone:**

1. Poor and unhealthy diet
2. Lack of sleep
3. Inadequate exercise (if any)
4. Long hours
5. Poor digestion
6. Emotional reactions
7. Financial problems
8. Hormone imbalance
9. Bad relationships
10. Work
11. Exposure to toxins
12. Degenerative changes in the body
13. Prescription drugs

And the list goes on....

If you want to move toward a life where nervous system insult is not a factor, you need to identify and follow appropriate lifestyle changes. There’s no way around it.

## So How Does Stress Affect Our Nervous System?

The ever-active nervous system responds to a body under stress by increasing sympathetic-nervous-system activity. This results in hyperactivity, restlessness, muscle tension, cardiovascular stress, and other intensified functions. If the stress is prolonged, or perceived to be prolonged, by your nervous system, various hormones and glands become overworked and you pay the price: chemical waste is produced. This waste causes degeneration of nerve cells, free radical damage throughout the body, and even further hormone imbalance.

Your hypothalamus is a portion of the brain that monitors function and responds to stresses in the body. It monitors and normalizes thirst, hunger, body temperature, water balance, blood pressure, and more. It also links the nervous system to the endocrine system via the pituitary gland. It works much like an air conditioning system in your home, where the thermostat monitors temperature. The thermostat can be set at a certain level, let's say 72 degrees. The thermostat then monitors the room temperature at that level. If it goes above 72, the thermostat senses that and signals the A/C unit to inject cool air into the system until the temperature gets down to 72 degrees once again. It has done its job. All is comfortable and well.

In the body, the hypothalamus is like a thermostat in that it tries to keep many important functions within range. In fact, one of the many roles of the hypothalamus is to normalize body temperature both through shivering, and through contraction or expansion of the blood vessels. But for our purposes here, let's say an intruder is breaking into our home.

When the brain perceives environmental danger, a primitive structure in the brain called the amygdala immediately fires a nerve impulse to the hypothalamus to kick off the body's fight-or-flight response through the sympathetic nervous system. This stress response starts with the hypothalamus stimulating the pituitary gland (also in the brain) to release a hormone called Adrenocorticotropic Hormone (ACTH). In turn, ACTH signals the adrenal glands to release cortisol, the stress hormone. Cortisol rises, followed by a cascade of physical effects and functions designed to aid in physical survival through the danger.

Once the intruder is subdued or leaves, the hypothalamus next has the job of reversing all the physiological stress created by the event because the stress is no longer needed for protection. So it signals the parasympathetic nervous system to start calming things down to normal levels. When working properly, this negative feedback loop keeps the nervous system functioning properly and all in check.

However, a problem arises when our brain senses we are in constant and ongoing stress. Long hours; improper sleep; inadequate or non-existent exercise; poor diet filled with fast foods, or processed and packaged foods; over-work; financial strain; physical pain and injury, and so on, cause the negative feedback loop to fail. That's when the chronic stress response runs unchecked throughout your day and night. The results to the nervous system are degenerative, detrimental, and catastrophic. A slow, ongoing breakdown of your nervous system and body are the result. Fatigue, mental fog, hormone imbalance, inflammation and pain, decreased range of motion, weight gain, loss of the will to participate in life—these are just a few of the results.

## Chronic Pain

Chronic pain is defined as pain that persists longer than it should, based on what we know about the natural healing recovery period associated with a particular disease or type of injury. The International Association for the Study of Pain defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue or cell damage.” We know about that! But it’s good to remember that pain is subjective and has complex routes. Only the person experiencing the pain knows how it truly feels.

Pain perception involves both the central nervous system and the peripheral nervous system. The receptors and nerves of the peripheral nervous system convey messages to the brain via the spinal cord. The specific parts of the brain that handle pain signals are the thalamus, the limbic system, and the sensory cortex.

Nociceptors are special nervous system receptors that convey information regarding damage and trauma from the various parts of the body to the brain. The brain interprets these signals as pain. Where persistent nociceptive signal transmission occurs, a “wind up” phenomenon induces an unhealthy change that allows pain signals to be transmitted more easily. This change may even “hijack” non-nociceptive types of nerve fibers and get them to transmit pain signals along with the fibers that are supposed to do the job. The result is what we term chronic pain.

Such responses may arise from injury or disease to nerve structures; or from degeneration and prolonged, abnormal function in the body. Chronic pain may also cause other symptoms and conditions such as depression or anxiety. It contributes to decreased physical activity and apprehension as well as psychosomatic and psychogenic conditions.

Chronic pain is a primary source of nervous system stress that leads to damage, degeneration, hormone imbalance, and aging of the body.

## ***How to Reboot Your Nervous System for Optimum Performance***



Wellness is a dimension of health that goes far beyond the absence of symptoms, disease, and infirmity. It is an on-going, day-to-day and moment-to-moment lifestyle that requires taking responsibility and making smart, healthy choices whenever you get the chance. Wellness follows the principle of maintaining optimum health by *preventing* the onset of disease and infirmity; also, by allowing the body’s innate healing intelligence to contribute to that prevention in the best ways possible. Wellness practice wants to remove the *causes* that lead to symptoms of distress.

Have you ever seen a bored newborn? Of course not. Babies radiate awe, joy, wonder, vitality, energy, life, and rejuvenation. It’s their natural state. But it’s your natural state, too. You are always in touch with the magic of life. Even the most ill person retains a healing ability: cut their skin, they’ll bleed and begin healing. If there’s life, there’s still a spark of healing, of hope.

Because your brain and the rest of your nervous system mediate your innate intelligence, it stands to reason that this system must be optimized to its highest potential if true health is to be achieved. Your nervous system really is your master computer. It regulates all functions of the body every second of your life. When it’s out of sync, you’re out of sync.

As a quick review from “Understanding the ‘Master Computer’” at the beginning of this nervous system topic, it is important to first understand just how this bio-computer of the human body works. We can then focus on proper ways to keep this computer in sync, allowing your best opportunity for “peak performance” wellness.

So, exactly how do you “reboot” your nervous system when it’s out of sync? And how do you keep it functioning at its highest level?

## ***In the Final Analysis ...***

Here’s the thing. You can either invest a little scheduled time each week to secure the fulfilling, abundant life you were destined to have, or you can plan on making a much larger, inconveniently scheduled investment in time, dollars, and quality of life down the road. That’s when you *or your caretakers* will be trying to clean up the mess left by poor health and disease. Many people “throw the dice” in hopes that they can get away without investing in regular physical activity. They bet that the odds are “different” for them, that they are the exception to the rule. But they are betting against the house, and the house gets its due. The saddest part is that very few dice throwers will never get to see themselves enjoying the fulfilling, abundant life they were destined to have had they embraced a simple habit and made a few, educated choices. Those interested in a wellness lifestyle don’t throw dice.

In summary, with a wellness lifestyle, you hold the reins. You are in a position to manage 95% of your body’s needs for ongoing health maintenance—as long as you don’t surrender to a medical lifestyle of drugs and surgery, and allowing others to make your most important quality-of-life decisions for you. Just as you are ultimately responsible for taking care of your teeth and gums—which includes regular check-ups and clean-ups—the same holds true for your nervous system. Having regular check-ups or “tune-ups” will prevent minor problems from turning into major ones that can leave you with permanent damage and a dimmer switch turned very low.

## ***How to Embrace Your Self-Care Opportunities***

Nervous system damage can result from disease, injury, or birth defects, but the most common damage, by far, comes from stress. Many self-care opportunities are available to help you avoid such damage. The key opportunities are three:

1. Develop stress awareness
2. Maximize your body’s ability to handle bouts of stress without nervous system damage. This means leading a healthful lifestyle and practicing relaxation techniques as well as biofeedback.
3. Learn how to manage stress that’s within your control—which is a lot. This includes developing and holding a positive outlook on life.

## ***Stress: What Is It, Really?***

In common use, the word “stress” covers a lot of ground. It carries at least three, closely related yet different meanings, depending on the context:

1. Stress sometimes means a collection of things that are happening in your life to throw you out of a “normal” state of balance or security. It constitutes those situations or conditions that pull you out of your physical, mental, and emotional comfort zones—or even threaten your survival. In formal language, these “things” are called “stressors.” Examples of stressors are worry, repetitive motions, fear in dangerous situations, job loss, strength training, the excitement of riding a roller coaster, getting a job promotion, or falling in love. Please note that the first four examples are what we usually think of as negative stress or “distress,” while the last four are normally considered to be positive stress, or “eustress.” The important thing to remember is that when stressors touch our lives, the body cannot recognize the difference between distress and eustress.
2. In common usage stress also means your body’s automatic *reactions* to your being pulled out of your physical, mental, and emotional comfort zones. This type of stress is the closest to your conscious awareness, and closest to the classical definition in Hans Selye’s original book, *Stress and Distress* (Selye was the founder of stress theory). This is the stress you can often feel. Here, your body is calling on its chemical and energy “reserves” to deal with both distress and eustress. These reactions are your body’s physiological protectors. If you have enough reserves, you’ll get along quite well.
3. Finally, stress is sometimes taken to mean your body’s innate *compensation* for dealing with those situations where the reserves of #2 simply fall short. Here we’re talking about what happens to the body when the reserves are simply not enough, either because they have been depleted from earlier attempts at rebalance, or because the stress load is just too large to handle even for someone with good reserves. That’s why some call this condition *overstress*. Overstress can and does “build up” and lead to things such as insomnia, exhaustion, premature aging, weight gain, and many more conditions too numerous to mention. If unattended, stress buildup can seriously damage physical health, psychological well-being, and relationships with friends, family, and coworkers. When it builds enough, the result must be disease, infirmity, or even death.

In reality, death is the body’s final compensation for stress buildup. Stress has won, as it always does, because that’s nature’s way. But those with high wellness I.Q.s don’t throw in the towel early. They find that life is much too valuable to be spending years or even decades mired in illness or feeling poorly. And they know they have a choice through intelligent self-care.

## Your Body's Automatic Stress-Protection System

In the physiological sense, stress is your body's *automatic* attempt to protect itself from injury or perceived dangers, *whether real or imagined*. When such "dangers" loom, your body's reactions include the following signs and symptoms, commonly called the *fight or flight response*:

- Increased secretion of adrenalin.
- Elevated blood pressure.
- Accelerated heartbeat.
- Greater muscle tension.
- A slowed or halted digestion.
- A release of fats and sugars from body stores.
- An elevation of cholesterol levels.
- A slight change in blood composition, making it more prone to clotting.
- An increase in the pituitary gland's production of the hormone, ACTH. This in turn stimulates the release of cortisone and cortisol. These inhibit disease-fighting white blood cells and suppress the immune response.

All these bodily reactions occur in the name of protection! And they work fine for those short-term situations where a heightened ability to react is important for protection and survival. The funny thing is that, today, very few of the dangers our bodies react to result from immediate physical threats or challenges, such as a tiger leaping at us from the underbrush. They come mostly from "modern" physical, chemical, and emotional stressors. Yet, the body still responds with its natural "fight or flight" behavior.

Today, hormones and other chemical messengers can pour into a stressed person over many hours of the day and night. Often such individuals have been following lifestyles that attract or inadvertently welcome many threats and dangers, both real and imagined. But the chemicals are not serving their intended, short-term, protective purposes. It's hard on a body to be expecting a tiger to jump out of the underbrush over many hours of the day. The continuous flow of chemicals starts to damage the system rather than protect it. Moreover, the chemicals may simply exhaust themselves so they are no longer available when *really* needed. For example, adrenal exhaustion is very common in people leading a stressful lifestyle.

## When Your Automatic Protection Isn't Enough ...

Yes, the body tries hard to accommodate modern stressors, but there is only so much it can do. Our protective resources are limited, and we become overstressed. The nervous system is one of the first bodily systems to react to the damage.

But there is an upside. In most cases, stress buildup announces itself long before you get into the danger zone. **You are in a position to catch it early, before it starts running away with you. If you want to experience the hidden harmonies of optimized living and satisfy your personal wellness potential, you must:**

1. Be able to recognize the early symptoms of stress buildup in your body and emotions.
2. Learn how to avoid—or at least sidestep—life challenges that lead to stress buildup.
3. Learn how to heal stress buildup that has already occurred.

**And what are some *early* hints of runaway stress? You may be surprised:**

- You cringe in front of a mirror because of growing bulges, fading muscle tone, or unmistakable signs of “premature aging.”
- Aches, pains, or a foggy brain have become your closest friends.
- You feel tension. You’re irritable. You aren’t able to concentrate.
- You experience dry mouth, tooth grinding, sweaty palms or cold hands, a pounding heart, shallow breathing, chronic headache, low self-esteem, or withdrawal.
- Your sleep quality is in the pits, and exhaustion rules your day.
- You get an upset stomach or urinate frequently.
- You have a lowered sexual drive.
- Your workouts are, well, not working out!
- Tight muscles may cause pain and trembling.
- You know your hormone balances are all out of whack, but you have no idea what to do about it other than suffer.
- You and your doctor are worried about the test “numbers” from your last physical exam.
- Your single greatest weapon for warding off surgery or chronic disease is hope.
- You are handling your quality-of-life problems with products from a drugstore.

You can avoid major problems if you identify symptoms of stress early. No, you can’t avoid all of life’s challenges, and you don’t want to avoid all of them in any case (eustress adds value), but the wellness-damaging challenges that you can avoid are much greater in number than you think. These are your opportunities to spare your nervous system! They start with taking personal responsibility for challenges under your control. Personal responsibility is a huge part of the wellness lifestyle.

The fact is we create many of our own challenges—or unwittingly (or carelessly) allow them to penetrate our lives. By becoming aware of such challenges, we are taking the first step towards eliminating them as agents of stress buildup. Once you know some of your stress symptoms and are aware of when stress occurs, you can begin to use stress management strategies to deal with it. Many stress experts even believe that how a person deals with stress may be more important than the number or type of demands he or she faces.

**So let's now get real about what you can do for self-care.**

1. It should be a foregone conclusion that you're interested in good nutrition, fitness, and exercise. Also, that you want to eliminate the bulk of the toxins coming into your life.
2. Use the Internet to get yourself educated about stress and your options for dealing with it. You want to be "more conscious" about your opportunities for managing stress. If you use the following search terms, you'll have plenty to work with: *stress*, *stress management*, *stress relief*, *stress symptoms*. Awareness education is number 1. But remember that you are taking the self-care approach. This is a lot about habits and lifestyle and has very little to do with drug stores or quick fixes.
3. If external events caused stress, then everyone would become stressed about the same things. But they don't. What does that say to you?
4. You cannot will your way out of stress. Nor can you hope your way out of it. Of course, you can try—which just creates more stress. You need to be proactive and use plenty of common sense to manage the stress in your life. For example, telling yourself to relax isn't going to get you very far, but imagining yourself successfully relaxing, and then following through, can get you a long way down the road to stress reduction.
5. Stop thinking of yourself as a victim of life events. That's not taking personal responsibility. Moreover, it simply creates more stress based on feelings of helplessness.
6. You shouldn't be trying to eliminate all stress from your life, for eustress is what brings joy and feelings of fulfillment or contentment. For example, it can give an athlete the energy to excel in physical competition. It can stimulate a scientist's thinking or a composer's creative energy. It can give many people the energy to solve problems and to finish hard work.
7. One of the greatest potential stressors is the challenge of change—any kind of change! Change is what happens between the time you are born and the time you die, and some will go so far as to say both before and after. Resistance to change creates extraordinary amounts of stress. If you can't make peace with change, and possibly even begin to welcome the adventures that come with it, stress buildup will quickly eat you up and destroy your quality of life. In contrast, creatively and proactively "going with the flow" brings great fulfillment and opportunity.
8. Starting today, begin to eliminate *just one thing* from your life that you know is creating stress for you—just one. Nobody can tell you what this should be, but learning how to eliminate stressors is the key to avoiding runaway stress. People are surprised at how little some things are "needed" in their lives. They are even more surprised at the relief that comes from eliminating them! Take responsibility. This discipline leads to great fulfillment.
9. Learn to say "no" with diplomacy. You can't be all things to all people. Start paying attention to the full cycle of events that occurs when you say "yes" out of habit, or out of the need to please. It's so very easy to say "yes," but it's far from easy to handle all the repercussions that come with it. Learning to catch yourself in the midst of saying "yes" may be one of the greatest gifts you will ever give yourself. "Let me think about it" is a crucial survival tool.
10. Don't *carry* stress to places where it is not needed. After all, you're not a 24/7 beast of burden. When you set it down, you will always be able to pick it up again, later, if you insist. Here's the point: if you don't put yourself in charge of the stress you lug around with you, who will?

11. Recognize that digital technology may create as much stress as a poor diet or lack of exercise. It, along with its endless marketing, wants to capture large parts of our lives to the point where we are serving it rather than it's serving us. Technology can be very, very good. Other times it can be enslaving. If you have to read a users' manual to remember how to set your wristwatch, something is amiss. So, discriminate before saying "yes" to new, complex digital technology. Not everyone is ready for it or needs all of its complexity. Consciously choose what will serve you well.
12. Drugs are toxins that create negative stress, even when they perform as intended without obvious side effects. Getting yourself in a position where you need to take as few drugs as possible is one of the greatest self-care opportunities available.
13. Consider professional advice regarding neurobiofeedback and other proven methods, including measuring heart rate variability and neurotransmitters to help you rebalance your nervous system and help the interaction between the neurological, immune, and endocrine systems.

Your quality of life is in your hands.