

THE ROLE OF THE VAGUS NERVE IN CHRONIC ILLNESS

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Article Summary:

The vagus nerve is actually a pair of cranial nerves that leave the brain and travel down through the body.

The vagus nerve relays information to and from various organs and structures of the body all the way down to the cellular level.

This cranial nerve has a widespread impact—its far-reaching effects include controlling the ability to decrease stressors in the body.

Poor vagus nerve function may manifest as many physical and mental symptoms and disorders.

Measuring heart rate variability and bowel transit time can assess vagus nerve function. Supporting the mitochondria also supports the vagus nerve function.

Amazing results are often seen from vagus nerve stimulation, which switches off the cell danger response—a mode where the healing process gets stuck.

Vagus nerve stimulation helps the healing process so the mitochondria can normalize and shift from defense mode back to energy-producing mode again.

Specific exercises, lifestyle habits, and supplements may not only help you feel better, but could also offer you a whole new life experience.

THE ROLE OF THE VAGUS NERVE IN CHRONIC ILLNESS (AND HOW STIMULATING IT MAY HELP YOU HEAL)

WHAT IS THE ROLE OF THE VAGUS NERVE?

The vagus nerve is the 10th pair of cranial nerves and is also referred to as the 10th cranial nerve. The human body has 12 cranial nerve pairs. These emerge directly from the brain or

brain stem, unlike spinal nerves, which emerge from the spinal cord. A cranial nerve relays messages and information between the brain and various parts of the body.¹

In your body, you have a vagus nerve on the left and right side. The vagus nerve is the only cranial nerve pair of the existing 12 pairs that leaves the cranium, or the part of the skull that encloses the brain. Although this versatile nerve does have some critical functions in and around the face and throat, it leaves the head and goes into other areas of the body. The word “vagus” comes from a Latin root, meaning “wandering.” As the name suggests, it wanders throughout the body to many vital organs.²

That’s what makes the vagus nerve so crucial—it’s the only cranial nerve pair that goes to other parts of the body. It connects and sends information to many different organs and structures inside the body, including the:³

Heart

Liver

Gallbladder

Lungs

Kidneys

Ureter

Sex organs (females)

Neck (pharynx, larynx, and esophagus)

Tongue

Stomach

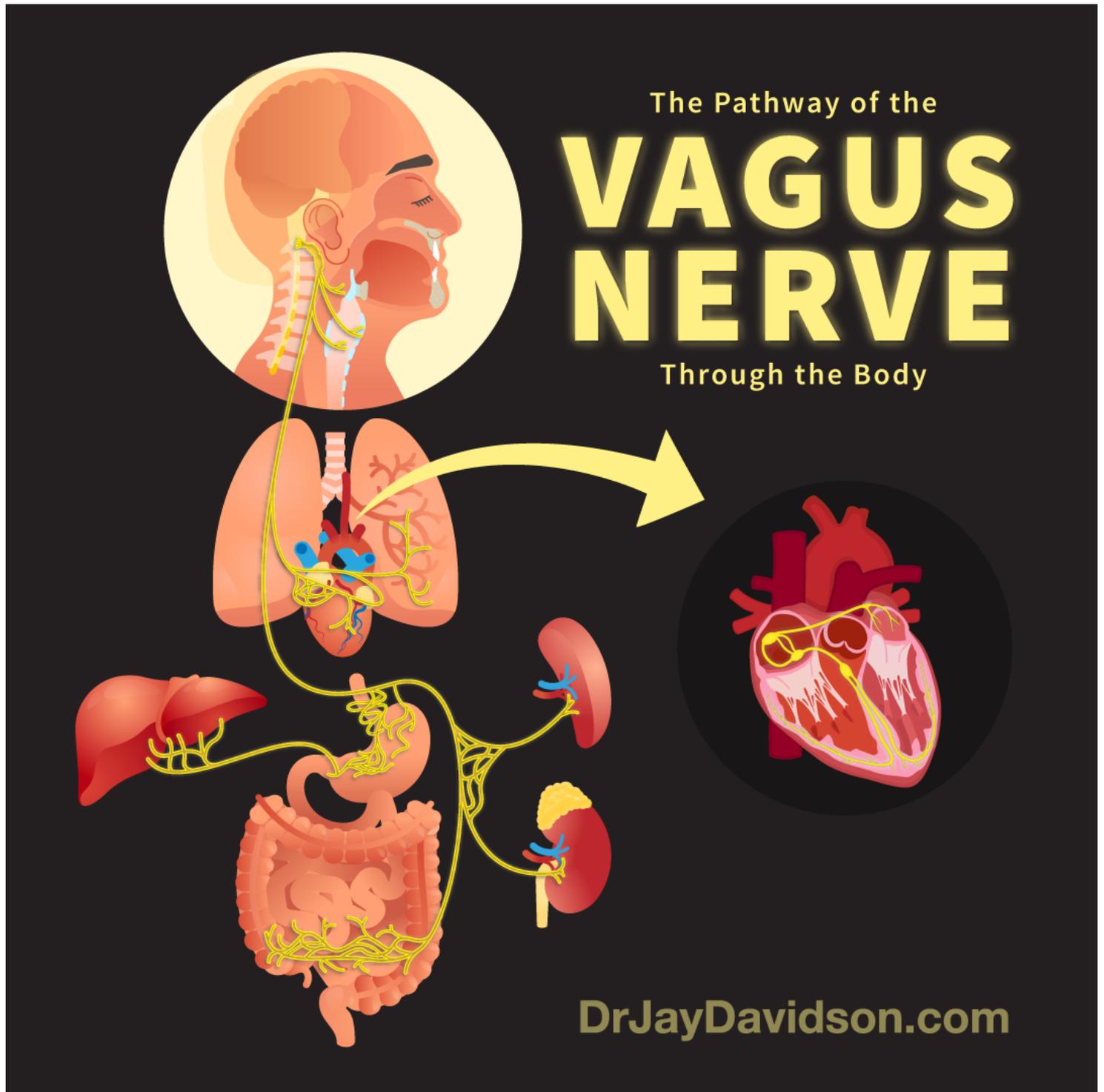
Spleen

Colon

Rest of the digestive tract

All of these organs need specific pieces of information passed to them from the brain. Plus, all of these organs, especially the ones in the gut, send information back to the brain. So the vagus nerve is essential for this bidirectional communication.⁴

The brain uses the vagus nerve to control the parasympathetic nervous system. The parasympathetic branch covers the rest, digest, detox, recovery, and healing aspect of the nervous system. Although the vagus nerve is not the only nerve controlling the ability to decrease stressors in the body, it is by far the single most important due to its far-reaching effects. No other cranial nerve has such a widespread impact as the vagus nerve.⁵



A DEEPER LOOK: THE VAGUS NERVE, THE MITOCHONDRIA, AND THE CELL DANGER RESPONSE

Well-known for their function as powerhouses of the cell, mitochondria are structures (organelles) found inside cells. They produce ATP, the body's energy currency. But it's less known that mitochondria also have a substantial role in cellular defense. When under threat, the mitochondria shift from being power plants to being defenders.⁶

The mitochondria largely control progression through the healing cycle. Also associated with the mitochondria is a metabolic function called the Cell Danger Response (CDR). Professor Robert Naviaux, M.D., Ph.D., from the University of California San Diego proposed CDR, a hypothesis about metabolic function.^{7 8}

Mitochondria protect and defend themselves and the body when they face threats from infections, toxins, chemicals, heavy metals, physical trauma, psychological trauma, and other environmental stressors. They do this through the natural cell danger response process. Theories associated with the CDR offer a new paradigm for understanding disease.

Metabolic dysfunction drives chronic disease

The Cell Danger Response is a natural, healthy way the body heals itself after threat or injury. In response to a threat, the mitochondria shift from their normal functions (energy production) into this specialized operation to fight off whatever threatens the body. This CDR mode protects the cells and the body from harm.

But as the CDR soldiers on, it can create a barrier to healing. The body can get stuck in the CDR, where the mitochondria have shut down energy production to deal with the threat. In some cases, the body doesn't shift back out of CDR as it should.⁹

This explains why some people heal faster than others. Some may be unable to move out of the CDR and fully heal. It also explains why a chronic disease that was treated "successfully" can reappear. It's like a form of metabolic "addiction," in which the recovering cell becomes conditioned and stuck in its impaired state.

Fatigue becomes a significant issue when the body gets stuck in CDR. While in cellular defense mode, the mitochondria produces less ATP, or less energy, to fuel the body. With a chronic infection, people typically shift to a persistent state of CDR and low energy production.

In this situation, you will need to find what is blocking the body from healing, not what first caused the illness. The chemical, toxin, bacteria, or virus may be long gone, but your CDR remains turned on. This is where an illness becomes chronic. To fight against chronic illness, you can take steps to unblock the healing process, which relates back to the vagus nerve.¹⁰

Vagus nerve stimulation switches off the cell danger response

The CDR appears to reflect what happens in the vagus nerve, so the CDR can be switched off by vagus nerve stimulation. Here's where the two branches of the vagus nerve — dorsal and ventral — come into play.

Bodies under threat from infection or trauma don't stay in a fight-or-flight response all the time. Many of them are in a freeze response. This is a collapsed, hibernation mode, which comes from the dorsal part of the vagus nerve. The dorsal vagus nerve kicks in when there is a threat — similar to what happens when an animal plays dead.

In other words, the body's response to threats is three-fold:

Fight-or-flight mode (the sympathetic nervous system)

Rest, digest, and heal mode (the parasympathetic nervous system activity associated with the ventral vagus nerve)

Collapsed, hibernating, shut down, or playing dead mode (the parasympathetic activity nervous system associated with the dorsal vagus nerve)

So then the trick is to get the nervous system to shift to the rest, digest, and heal mode by stimulating the ventral vagus nerve. This will address chronic illness, reduce inflammation, and stimulate more healing functions.

When the ventral part of the vagus nerve is in full swing, you feel good. You feel happy and uplifted. You feel socially connected. You are in a state of well-being. And this reflects at the cellular level, since the vagus nerve connects to the brain and provides communication between the brain and the cells.¹¹

The ventral vagus nerve plays a fundamental role in healing, and it's also the part that gets switched off when the Cell Danger Response takes over. When the ventral vagus nerve is stimulated, it tells the CDR that everything is okay. Then your body can move away from being stuck and allow for healing. Because everything is connected, what happens at the cellular level also happens at the nervous system level.

DETERMINING IF THE VAGUS NERVE IS WORKING CORRECTLY

Because of the vagus nerve's widespread impact, it's important to know whether it's functioning correctly. A properly working vagus nerve has clear pathways with information free-flowing in both directions.

But specific situations, such as diseases or direct injury, can cause interference and then lower function. To ensure its functioning optimally, the following two simple tests can help measure vagus nerve function: ¹²

Bowel transit time, which is a measurement of how long it takes for food to travel through the digestive tract. The vagus nerve keeps the digestive tract moving at its optimal pace. Variations from the optimal pace can signal a loss of vagus nerve control.

Heart rate variability, which measures the variation in time between each heartbeat.

Vagal tone and heart rate variability

The autonomic nervous system is subdivided into two components:

Sympathetic: Fight-or-flight response

Parasympathetic: Relaxation response

The autonomic nervous system, via the vagus nerve, sends a signal to the heart. That signal continues to the SA node of the heart, which regulates the organ's electrical activity.

Communication between the vagus nerve and SA node is very clear when the following occur:

The vagal nerve tone is healthy

The autonomic nervous system functions well

There is unimpaired balance between the sympathetic and the parasympathetic nervous system

In this case, there will be small variations in the amount of time between each beat of the heart. That is called high heart rate variability.¹³

Heart rate variability (HRV) demonstrates vagal nerve tone by measuring the variation in the time between each heartbeat. Measuring HRV is a noninvasive way to identify imbalances in the autonomic nervous system and vagus nerve. If an individual's system spends more time in fight-or-flight (sympathetic) mode, the variation between subsequent heartbeats is low. When the CDR activates, both vagal tone and HRV lowers.

Recent research shows a relationship between low HRV and worsening anxiety or depression. A low HRV is also associated with an increased risk of cardiovascular disease and death.¹⁴

SUPPORTING THE MITOCHONDRIA TO SUPPORT THE VAGUS NERVE

Since this system is bidirectional, supporting the mitochondria can serve to support the vagus nerve and vagal tone. Poor vagus nerve function may manifest in many ways, including these symptoms and disorders:¹⁵

Weight gain and obesity

Anxiety

Depression
Chronic fatigue
High or low heart rate
Chronic inflammation
Irritable bowel syndrome
Difficulty swallowing
Gastroparesis (delayed gastric emptying)
Heartburn
Dizziness and fainting
B12 deficiency

Not surprisingly, most of these signs and symptoms of vagus nerve dysfunction are signs and symptoms of poor mitochondrial function as well. As a result, mitochondrial-support products may help improve vagus nerve function.

It also helps to remove any upstream sources of interference that damage the mitochondria. For example, chemical toxins, heavy metals, environmental toxins, EMFs, and forms of infection (bacterial, viral, and parasitic).¹⁶

ACTIVATING THE VAGUS NERVE AND REVERSING THE CELL DANGER RESPONSE

To combat chronic illness and other conditions, the aim is to shut off the fight-or-flight response and exit the dorsal vagus hibernation mode. Then you can reestablish the ventral vagus nerve's rest, relax, and heal process. Anything that raises heart rate variability increases vagal tone.

Lifestyle modifications can help with daily vagus nerve stimulation. The FDA has approved vagus nerve stimulation for a wide range of illnesses. Amazing results often come from stimulating the vagus nerve, which switches off the CDR and helps mitochondria return to energy-producing mode again.¹⁷

10 Ways to Stimulate Your Vagus Nerve Naturally



Gargling



Stimulating the
gag reflex



Rhythmic or
deep breathing



Chanting



Meditation



Splashing your
face with
cold water



Eating
healthy



Fasting



Acupuncture



Coffee enemas

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► Physical activity

Along with its other numerous benefits, physical activity looks to help stimulate the vagus nerve. One recent study found that mild exercise stimulated the vagal nerve, which then supported gastric emptying and improved digestion.¹⁸

► Yoga, tai chi, and qigong

Yoga is an exercise that activates the parasympathetic nervous system. It improves digestion, blood flow, lung capacity, and mood and anxiety levels. GABA — a neurotransmitter associated with lifting mood and anxiety — increases in people who perform yoga and other mindful movement exercises. Related to this, tai chi has been shown to increase HRV in patients who have coronary artery disease, while qigong exercise can improve HRV in survivors of nasopharyngeal cancer.^{19 20 21}

► Meditation

Two different types of meditation — loving-kindness meditation and guided mindfulness meditation — have been shown to increase heart rate variability and vagal tone. Chanting stimulates the vagus nerve as well. Regular meditation and positive affirmation can help people achieve better heart rate variability.²²

► Cold therapy

Cold therapy and cryotherapy have many benefits, including enhancing immune functions, decreasing inflammation, and speeding up recovery time from exercise. Acute cold exposure activates the vagus nerve and the neurons (nerve cells) through vagus nerve pathways. So cold exposure can also increase parasympathetic activity through the vagus nerve, lowering the fight-or-flight sympathetic response.²³

Acute cold exposures that can stimulate the vagus nerve include:

Cold showers

Splashing cold water on the face

Dipping the face in cold water

Drinking cold fluids

Cryohelmets or cold vests

► Deep breathing

It's well established that deep, slow breathing can promote relaxation. Vagal stimulation can lead to relaxation, but the reverse is also true—relaxation can stimulate the vagus nerve. So inducing a relaxed state through deep breathing can help increase vagal tone. Practice breathing slowly as your belly rises and falls to engage the diaphragm muscle. The more your belly expands upon inhale and contracts upon exhale, the deeper you are breathing.²⁴

► Singing, humming, and chanting

The vagus nerve attaches to the vocal cords. As a result, singing, humming, and chanting can activate it. Hymn singing, mantra chanting, and energetic singing all increase heart rate variability in slightly different ways. Loud singing gives the muscles at the back of the throat a workout, activating the vagus nerve.²⁵

► Gargling

Gargling can help to stimulate the vagus nerve. Gargling with a glass of water each morning and night when you brush your teeth will help to work the muscles in the back of your throat. This activates the vagus nerve and boosts digestive functions. Keep a glass next to your bathroom sink as a daily reminder to perform this exercise. If you gargle to the point where

tears well up in the eyes, it's even more useful. This is an easy and effective exercise to incorporate into your daily routine.²⁶

► Chewing

Chewing activates the vagus nerve as well. This means that chewing gum and chewing your food thoroughly can both stimulate the vagus nerve. Take the time to chew your food before you swallow it. This will set the correct digestion sequence in motion and allow the vagus nerve to function as it should.²⁷

► Intermittent fasting

Intermittent fasting can benefit many areas of your health. It may improve mitochondrial and cognitive functions. It can also boost metabolism and reduce the risk of diseases. These potential health benefits might stem from the fact that intermittent fasting can stimulate the vagus nerve and improve vagal tone. Intermittent fasting also helps to increase high-frequency heart rate variability.²⁸

► Massage

Massage can be beneficial in activating the vagus nerve. Foot reflexology and massages can increase vagus nerve activity, heart rate variability, and lower heart rate and blood pressure.²⁹

► Laughter

Laughter has demonstrated the ability to increase heart rate variability in a study of laughter yoga participants. Laughter, as long as it's not overdone, has many other notable health benefits as well.³⁰

► Social enjoyment

Being social with friends and family is an excellent way to relax. Additionally, positive social interactions lead to positive emotions, which improve vagal tone.³¹

► Acupuncture

Acupuncture, the traditional Chinese medicine treatment, may help to stimulate the vagus nerve and improve heart rate variability.³²

► Coffee enemas

Enemas trigger vagus nerve activation through expanding the bowel. Coffee enemas in particular offer a unique form of cleansing for the liver and bile duct drainage systems. In your body's detox process, toxins are dumped in the bile, and the toxic bile gets released into the intestines for evacuation. The body's entire blood supply normally circulates through the liver every three minutes. Holding a coffee enema for a time will supercharge this cleansing, and the water content of the coffee helps to rinse out the toxic bile.³³

► Other methods

Some other ways you can stimulate the vagus nerve include:^{34 35}

Eating healthy foods

Using essential oils

Sunlight exposure

Improving sleep quality

Circadian rhythm management

Spending time in nature

Water therapies

Gratitude journaling

Many of these are practical and don't cost much, yet help to reset the nervous system.

RECOVERY FROM VAGUS NERVE DYSFUNCTION AND CHRONIC ILLNESS

In summary, your vagus nerve manages your digestion, rest, and recovery status. A calm, relaxed emotional state helps encourage recovery. This causes the vagus nerve to relay to your brain and your individual cells to initiate healing. Your brain and cells need this message to know it's safe and that your body can now switch to healing mode. Following some of these exercises and lifestyle habits may help you feel better, plus offer you a whole new relaxed, calm, and comfortable life experience.

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