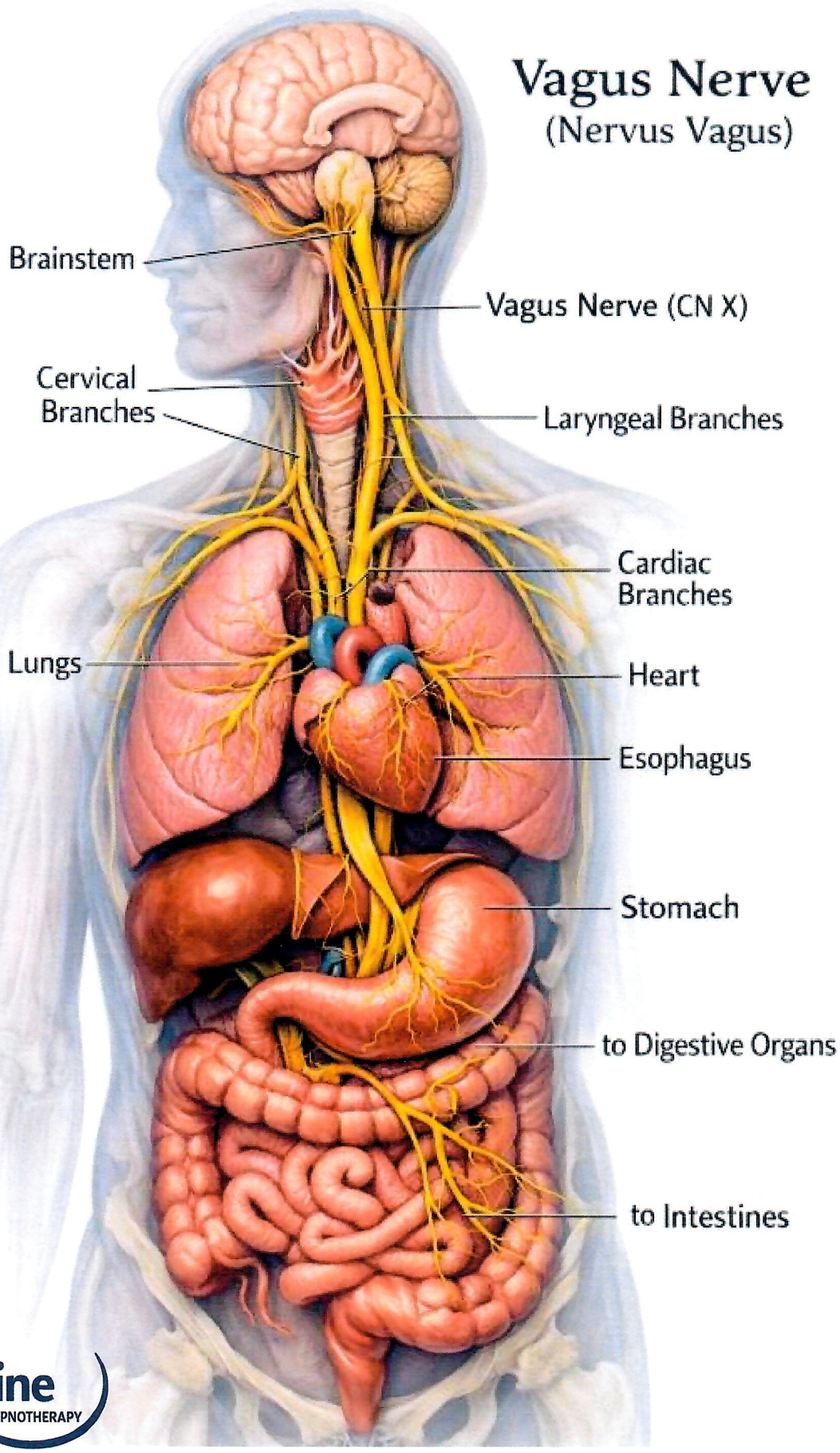
Vagus Nerve
(Nervus Vagus)



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CORE FUNCTIONS OF THE VAGUS NERVE

The **vagus nerve (cranial nerve X)** is one of the most vital components of the parasympathetic nervous system, influencing nearly every major organ from the brainstem to the intestines.

1. **Autonomic Regulation** — Controls heart rate, blood pressure, and respiration by slowing the heartbeat and promoting calm states.
2. **Digestive Control** — Stimulates stomach acid secretion, peristalsis, and digestive enzyme release; coordinates swallowing and gut motility.
3. **Inflammation Modulation** — Activates the "cholinergic anti-inflammatory pathway," reducing cytokine production and systemic inflammation.
4. **Sensory Feedback** — Carries sensory information from the throat, lungs, heart, and abdominal organs to the brain, helping regulate internal states.
5. **Speech and Swallowing** — Controls muscles of the larynx and pharynx, enabling vocalization and safe swallowing.
6. **Mood and Stress Response** — Influences emotional regulation via connections with the limbic system; vagal tone correlates with resilience and calm.
7. **Reflex Actions** — Mediates reflexes such as coughing, gagging, and vomiting.
8. **Metabolic and Endocrine Influence** — Communicates with the pancreas and liver to regulate insulin release and glucose metabolism.
9. **Cardiopulmonary Coordination** — Adjusts breathing rhythm and heart rate during rest and exertion.
10. **Gut–Brain Communication** — Serves as the main conduit for the gut–brain axis, transmitting signals that affect appetite, mood, and immune function.

Practices That Support the Vagus Nerve

Category	Practices	How They Help
Breath-based practices	Slow diaphragmatic breathing; extended exhalations; box breathing	Stimulate parasympathetic pathways that slow heart rate and calm the body
Movement & physical rhythm	Walking, swimming, cycling, tai chi, gentle yoga	Improve autonomic balance and reduce sympathetic overactivation
Mind-body regulation	Meditation, mindfulness, body scans, **hypnotherapy**	Strengthen vagal tone and emotional regulation
Vocal & throat stimulation	Humming, chanting, singing	Activate vagal branches connected to the larynx
Cold-based stimulation	Splashing cool water on the face; brief cold exposure	Triggers the mammalian dive reflex, increasing vagal activity
Social & emotional practices	Warm conversation, safe relationships, laughter, play	Activate the ventral vagal system tied to safety and connection
Gut-supportive habits	Fiber-rich meals, regular eating patterns, hydration	Support the gut–brain axis, a major vagal communication route
Sleep & recovery	Consistent sleep schedule, wind-down routines	Restore autonomic balance and reduce chronic stress load
Posture & neck mobility	Gentle stretching, reducing forward-head posture	May reduce mechanical tension around the nerve's cervical pathway
Inflammation-reducing habits	Balanced meals, stress reduction, regular movement	Support the vagus nerve's role in the anti-inflammatory pathway

HOW HYPNOTHERAPY CAN SUPPORT VAGUS NERVE FUNCTION

1. **Deep relaxation response.** Hypnotherapy induces a state of calm that reduces sympathetic ("fight-or-flight") nervous system (SNS) activity. This shift naturally allows parasympathetic (PNS) pathways — including the vagus nerve — to become more active.
2. **Breath and body awareness.** Hypnotherapy guides clients into slower, deeper breathing. Slow exhalations are one of the strongest natural activators of "vagal tone" (the strength, responsiveness, and baseline activity of the vagus nerve).
3. **Stress and anxiety reduction.** Chronic stress suppresses vagus-nerve function. Hypnotherapy can help people regulate stress responses, supporting the vagal pathways involved in heart rate, digestion, and emotional balance.
4. **Improved emotional regulation.** The vagus nerve is deeply tied to the limbic system. Hypnotherapy techniques can help clients reframe emotional triggers that would otherwise trigger the "fight or flight" response.
5. **Enhanced interoception.** Interoception — sensing internal bodily states — is partly mediated by vagal sensory fibers. Hypnotherapy can heighten internal awareness, helping clients notice and respond to stress signals earlier.
6. **Vocal and throat stimulation.** Hypnotherapy techniques, in particular the verbal repetition of therapeutic affirmations emphasizing the vibration of vocal cords, can positively activate the vagal branches connected to the larynx.
7. **Image Work.** Hypnotherapy is a natural state characterized by extraordinary physical relaxation and mental alertness. These allow clients to work in the subconscious mind where imagery (literal or metaphorical) can promote the healthy functions of the vagus nerve system, including its anti-inflammatory response.

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Vagus Nerve Function & Inflammation: Further Reading

"The vagus nerve and the inflammatory reflex—linking immunity and metabolism," by Valentin A Pavlov. *Nature Reviews: Endocrinology*, December, 2012. https://doi.org/10.1038/nrendo.2012.189

From the abstract: "The vagus nerve has an important role in regulation of metabolic homeostasis, and efferent vagus nerve-mediated cholinergic signaling controls immune function and proinflammatory responses via the inflammatory reflex. Dysregulation of metabolism and immune function in obesity are associated with chronic inflammation, a critical step in the pathogenesis of insulin resistance and type 2 diabetes mellitus."

"Non-invasive vagus nerve stimulation in anti-inflammatory therapy: mechanistic insights and future perspectives." *Frontiers in Neuroscience*, November 12, 2024, Volume 18, 2024. https://doi.org/10.3389/fnins.2024.1490300

From the introduction: "Inflammation is a vital biological response that protects the body from harmful stimuli, such as pathogens, damaged cells, and irritants. This complex process, marked by the coordinated activation of immune and non-immune cells, is essential for pathogen clearance and tissue repair. However, inflammation can also be a double-edged sword. Acute inflammation is a rapid, self-limiting response critical for immediate defense and healing. In contrast, chronic inflammation is a prolonged, dysregulated process that can persist for months or even years, often without an overt pathogen. Chronic inflammation is a key driver of numerous diseases, including autoimmune disorders, cardiovascular diseases, metabolic syndrome, neurodegenerative conditions, and various cancers."

"Cholinergic reflex control of inflammation: mechanistic and translational advances in transcutaneous auricular vagus nerve stimulation across rheumatic, metabolic, and postoperative disorders." *Frontiers of Immunology,* 20 January 2026, Volume 16 – 2025. https://doi.org/10.3389/fimmu.2025.1702185

From the abstract: "The vagus nerve functions as a critical neuroimmune interface, tonically suppressing proinflammatory cytokine release via the cholinergic anti-inflammatory pathway (CAP). This mechanism provides substantial therapeutic potential across a spectrum of inflammatory disorders, including postoperative systemic inflammation."

"A Possible Role for the Vagus Nerve in Physical and Mental Health." *Biomolecules* 2026, *16*(1), 121. 12, January 2026. https://doi.org/10.3390/biom16010121

From the abstract: "For decades, researchers have explored the therapeutic potential of the vagus nerve through vagus nerve stimulation (VNS). Initially developed for epilepsy, VNS has since been applied to treat resistant depression, stroke recovery, and inflammatory conditions. Transcutaneous VNS (tVNS) now offers a noninvasive alternative, fueling clinical trials in disorders ranging from rheumatoid arthritis and migraines to long COVID-19...Depression studies, in particular, highlight both the promise and the complexity of VNS, as inflammation, motivation circuits, and gut–brain signaling emerge as key modulators."

HOW A HEALTHY VAGUS NERVE SUPPRESSES INFLAMMATION

The vagus nerve suppresses inflammation primarily through the cholinergic anti-inflammatory pathway, where acetylcholine released from vagal efferents binds to α7 nicotinic receptors on immune cells, inhibiting pro-inflammatory cytokine production.

Overview of the Mechanism

1. Afferent signaling: peripheral inflammation produces cytokines like TNF-α, IL-1β, and IL-6, which are detected by vagal sensory fibers. These signals travel to the nucleus tractus solitarius (NTS) in the brainstem, alerting the central nervous system to the inflammatory state.
2. Central processing: the NTS relays information to the dorsal motor nucleus of the vagus, coordinating the efferent anti-inflammatory response.
3. Vagal efferent fibers descend to the celiac ganglion, activating postganglionic splenic nerve fibers. In the spleen, noradrenaline released from these fibers stimulates choline acetyltransferase-positive (ChAT+) T cells, which then release acetylcholine.
4. Immune cell modulation: acetylcholine binds to the α7 nicotinic acetylcholine receptor (α7nAChR) on macrophages and other immune cells. This binding inhibits the release of pro-inflammatory cytokines such as TNF-α and IL-6, effectively dampening the inflammatory response and preventing tissue damage from excessive inflammation.

Additional Mechanisms

1. The vagus nerve also influences innate and adaptive immunity, modulating macrophages, neutrophils, monocytes, and T lymphocytes through efferent cholinergic signals.
2. The vagus nerve can inhibit inflammatory signaling pathways, including NF-κB, and counteract stress hormones like adrenaline and cortisol, further reducing systemic inflammation.
3. Sensory fibers from the vagus relay visceral information to the CNS, integrating signals from multiple brain regions (raphe nucleus, locus coeruleus, hypothalamus, amygdala) to fine-tune immune responses.

Clinical Implications

Activation of this pathway through vagus nerve stimulation (VNS) has shown promise in treating chronic inflammatory and autoimmune conditions, such as rheumatoid arthritis and inflammatory bowel disease. Both invasive and non-invasive VNS approaches can enhance vagal activity, reduce cytokine production, and improve clinical outcomes.

Sources:

- *https://www.vagusresearch.com/library/vns-and-inflammationAnti-Inflammatory Pathway https://plminstitute.org/plmi-blog/implications-of-the-vagus-nerve-and-immune-system-connection-for-inflammation-autoimmune-diseases-mental-health/*
- *https://vagusnerve.com/the-impact-of-the-vagus-nerve-on-inflammation-exploring-the-connection/*
- *https://www.frontiersin.org/journals/neuroscience/articles/10.3389/fnins.2024.1490300/fulle vagus nerve stimulation in anti-inflammatory therapy: mechanistic insights and future perspectives*