Innovating the Future in Medicine

“e-body”™

Possover Marc, PhD MD

e-Body

Central Nervous System

Signal integration oder Neural regulation.

Somatic Nervous System

The somatic nervous system is responsible for voluntary control of body movements and the conscious processing of sensory information.

Autonomic Nervous System

The autonomic nervous system regulates involuntary functions such as heart rate, blood pressure, digestion, and respiratory activity, maintaining internal balance without conscious effort.

Stimulation
Somatic Nerves

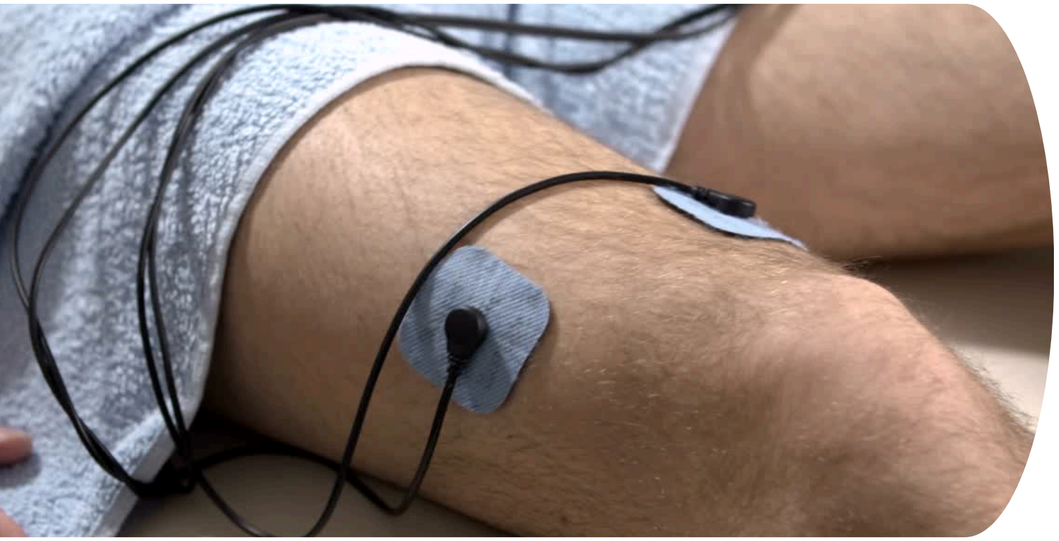
Stimulating a single muscle group can activate the entire body.
Because all muscles are interconnected via the musculoskeletal system, local stimulation influences broader neuromuscular networks.
Kerkman et al. (2018) demonstrated that this network structure shapes neural interactions across multiple timescales.

Reference:
Kerkman JN et al. Sci Adv. 2018;4:eaat0497.

e-body of the somatic nervous system

Continuous 24/7 in body ENS

- Training and building all the muscles of the body passively, while allowing you to go about your professional and social activities as normal.
- Muscle training positively influences osteoporosis by increasing bone density, improving balance, and reducing fracture risk.



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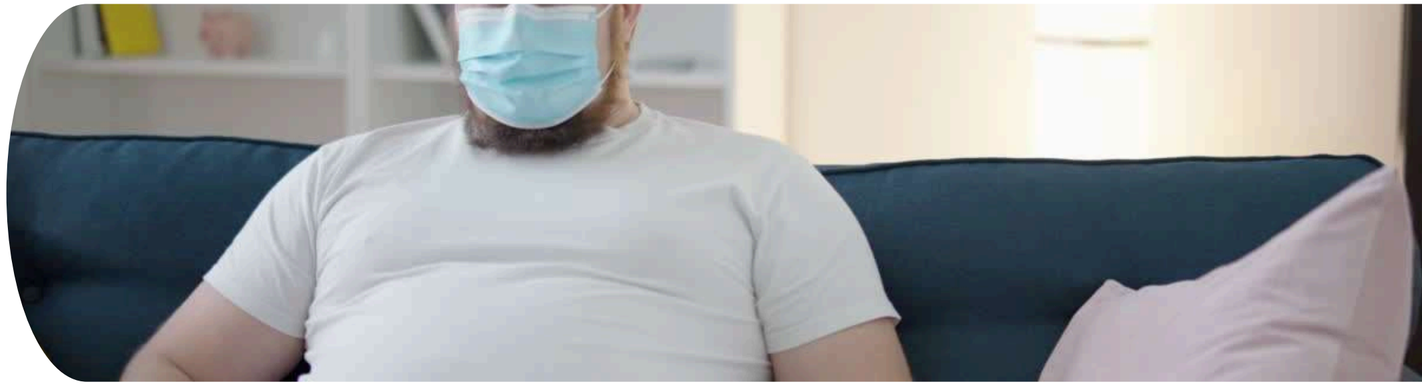
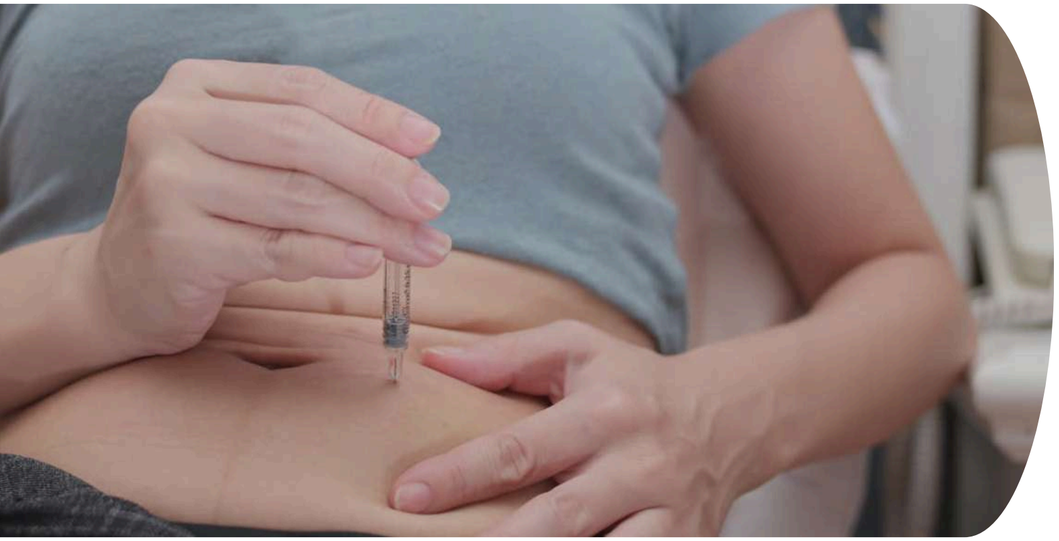
- Non-Alcoholic Fatty Liver Disease (NAFLD)





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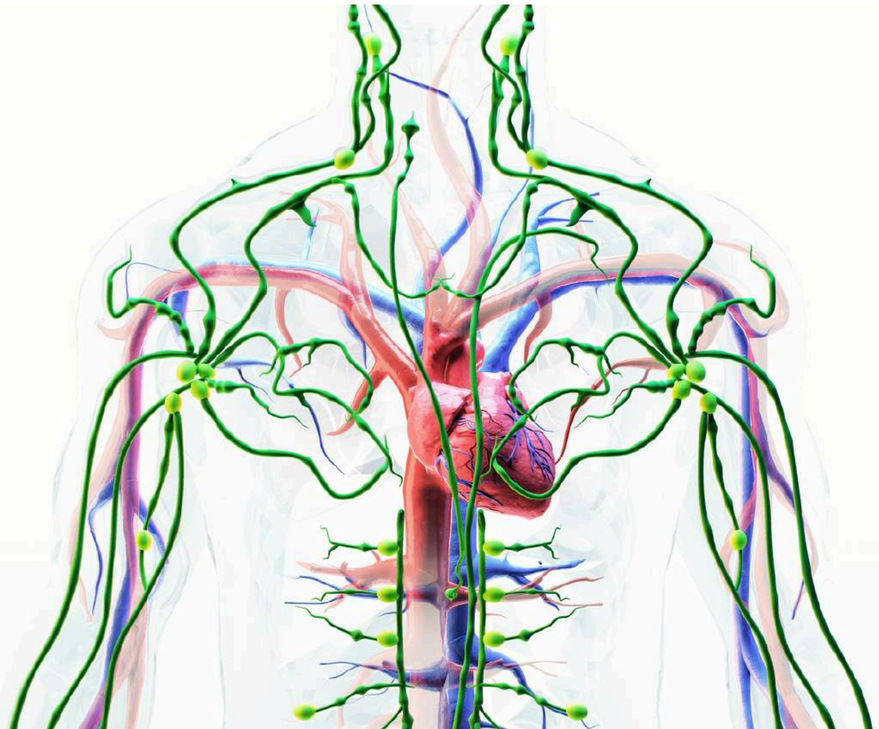
- Muscle training positively influences osteoporosis by increasing bone density, improving balance, and reducing fracture risk.
- Non-Alcoholic Fatty Liver Disease (NAFLD)
- Sarcopenia

The Key in Neuromodulation

Autonomic Nervous System



Sympathetic
Parasympathetic

The Journal of Spinal Cord Medicine

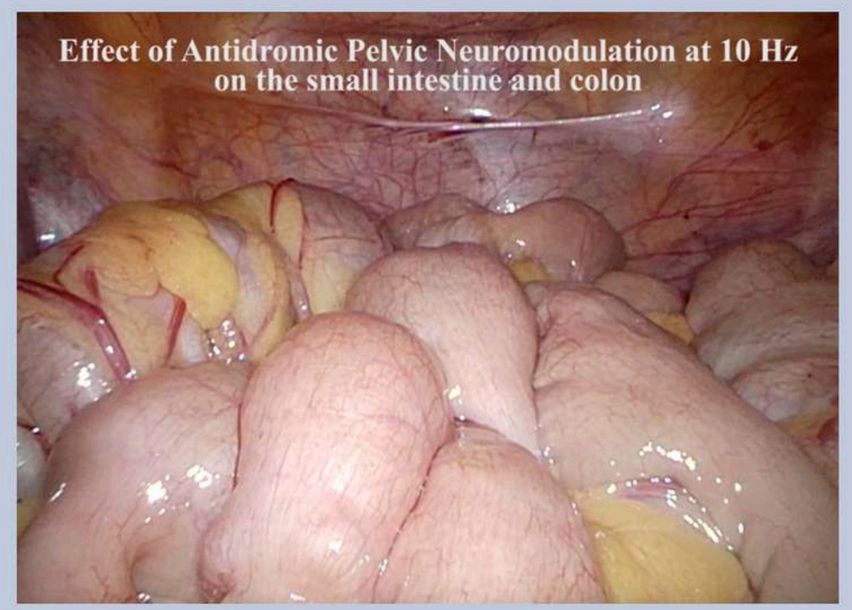
Effects of "*Continuous Antidromic Pelvic Neuromodulation - CAPN*" on spinal and autonomic neural pathways in chronic SCI peoples.

Possover Marc, MD, PhD

Background

70% of SCI after LION procedure presented recovery of walker-assisted gait

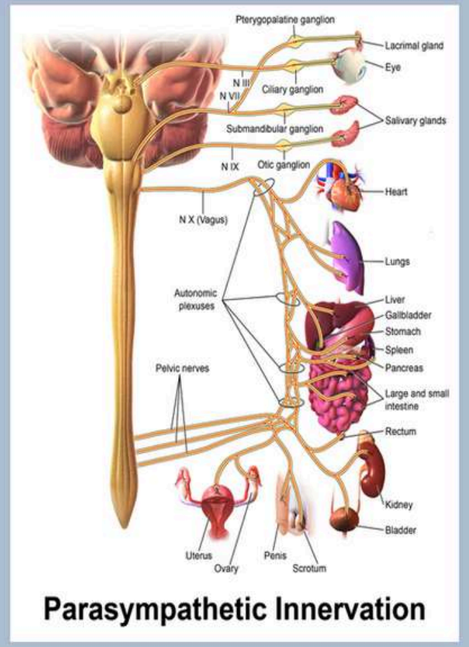
Methods



CAPN induced:

- **massive peristalsis of the small bowel & left colon**
- **significant reduction in the heart rate.**
- **→ demonstrate the existence of pathways between pelvic somatic nerves and vagus nerve**

Results

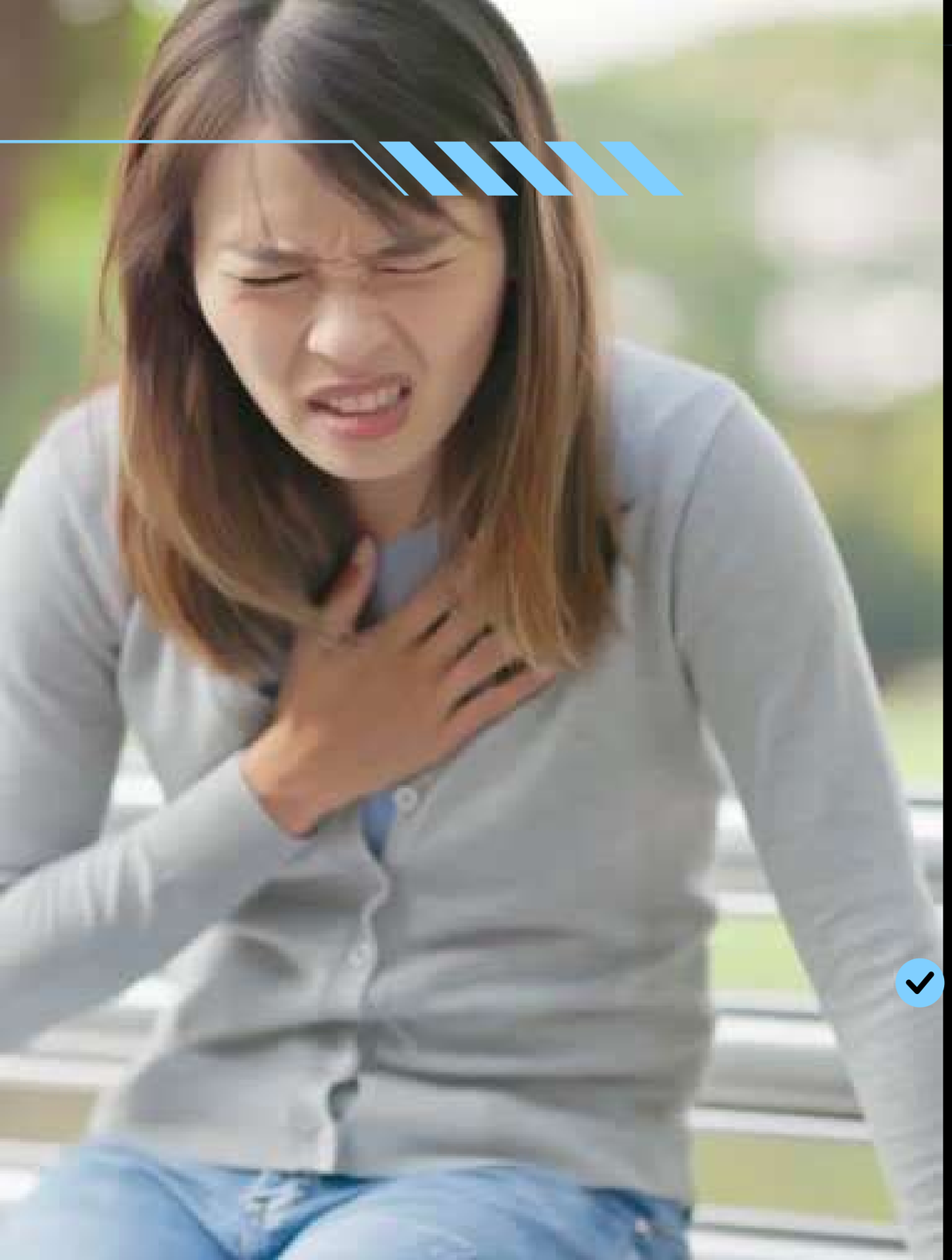


Activation of the vagus nerve using Continuous Antidromic Pelvic Neuromodulation for walker-assisted gait recovery in complete spinal cord injury

Blood Vessels

Stimulation of the parasympathetic nervous system—mainly via the vagus nerve—can cause vasodilation through acetylcholine release, which stimulates nitric oxide production in the blood vessels, leading to relaxation of vascular smooth muscle and increased blood flow. It also lowers heart rate and blood pressure.

“Parasympathetic nerves exert their vasodilatory effects mainly through acetylcholine-induced nitric oxide release from the endothelium.”
– Berne & Levy Physiology, 7th Edition, Elsevier, 2021.



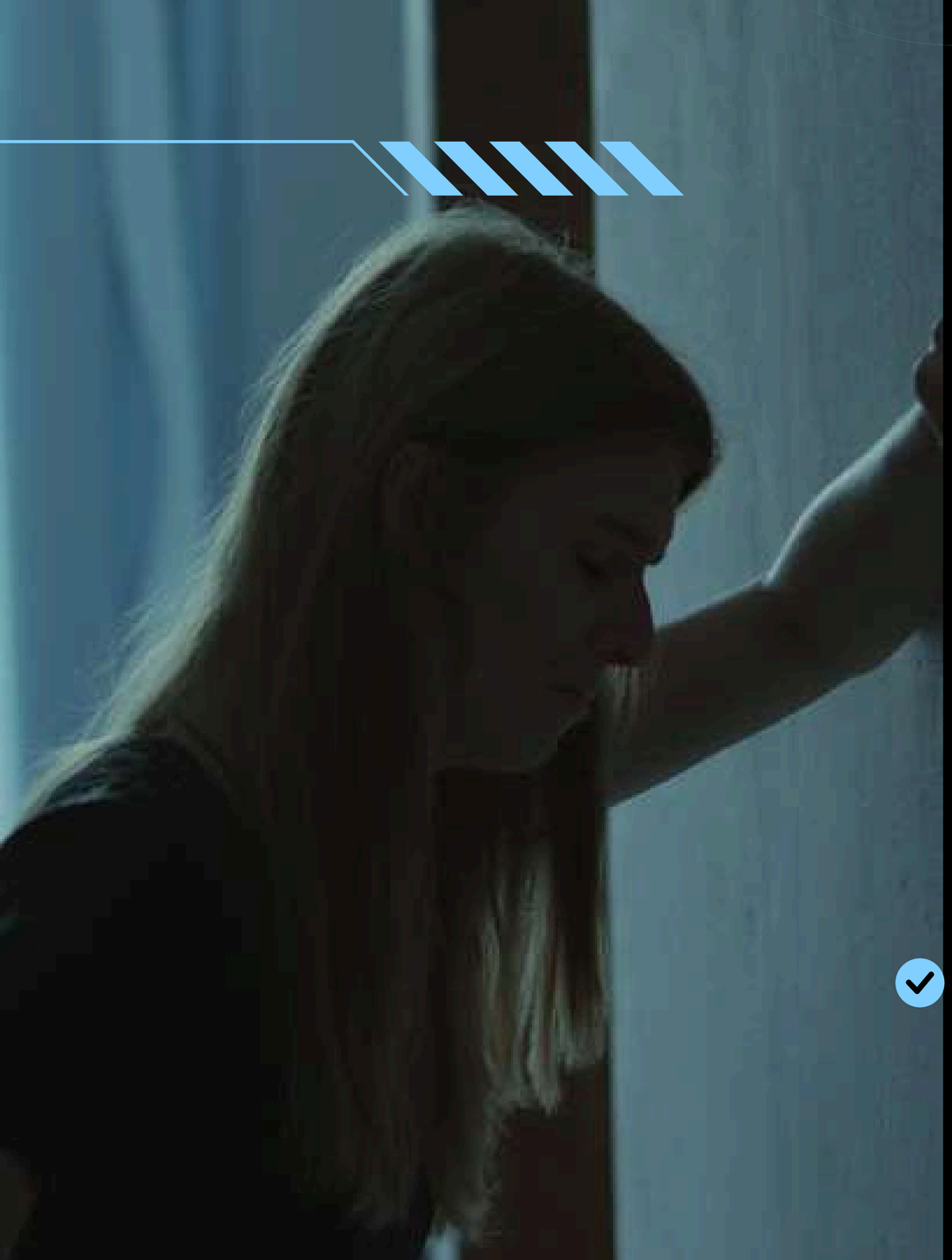
Cardiac Blood Pressure

Vasodilation lowers blood pressure by reducing vascular resistance and improves blood flow to the heart. This decreases the heart's workload and oxygen demand, helping to prevent heart attacks and manage hypertension.

Bone Density

Vasodilation improves bone blood flow, which supports osteoblast activity and nutrient delivery essential for bone remodeling. Impaired vascular supply has been linked to bone loss and osteoporosis, especially in aging.

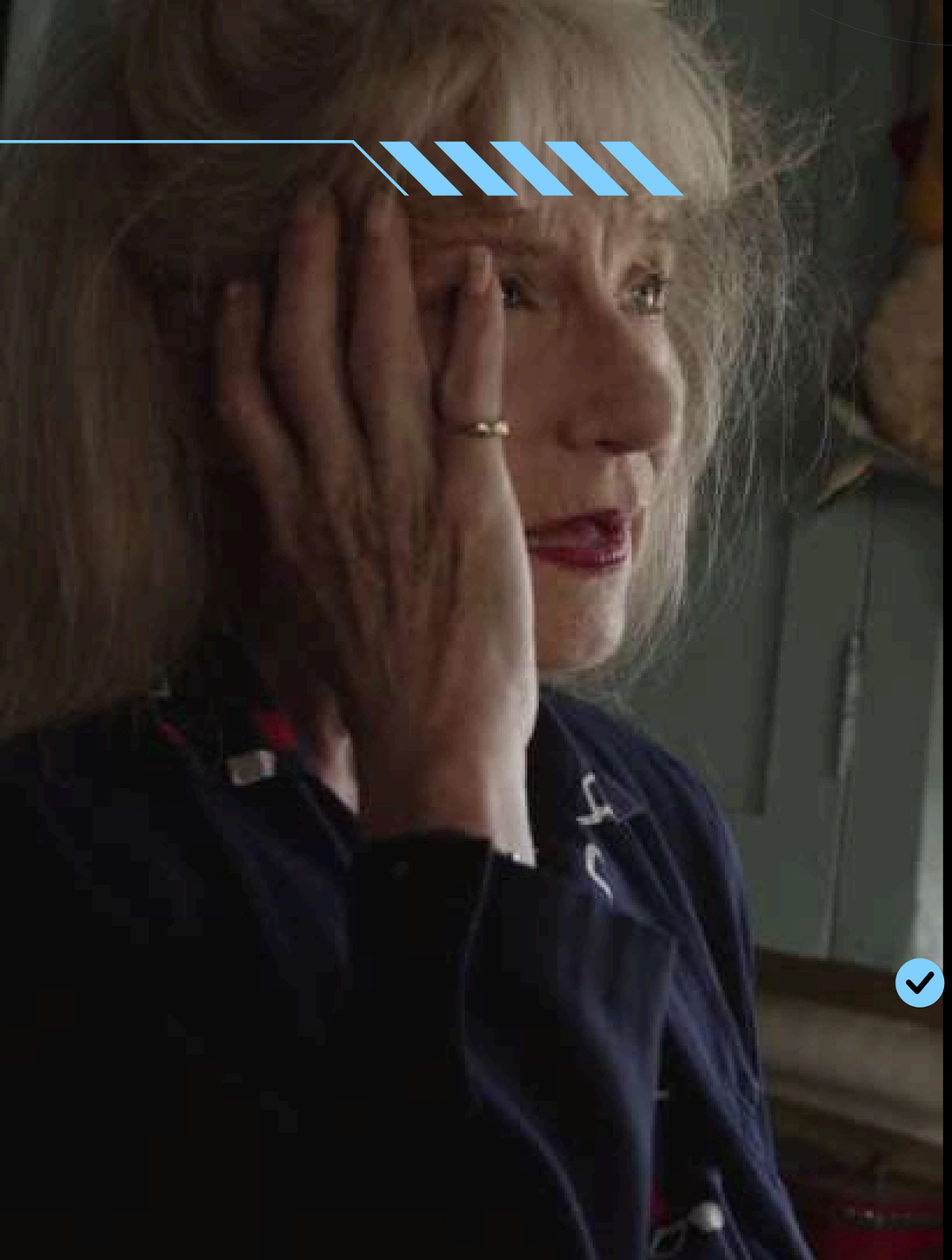
Reduced bone perfusion contributes to osteoporosis by impairing bone remodeling.”
– Prisby RD. The Role of the Vasculature in Bone Health and Disease. Front Endocrinol (2017);8:52. doi:10.3389/fendo.2017.00052



Brain Depression

Vagus nerve stimulation (VNS) is an FDA-approved therapy for treatment-resistant depression. It modulates brain regions involved in mood regulation (e.g., amygdala, prefrontal cortex) and enhances neurotransmitter balance (e.g., serotonin, norepinephrine). VNS reduces depressive symptoms by improving neuroplasticity and stress resilience.

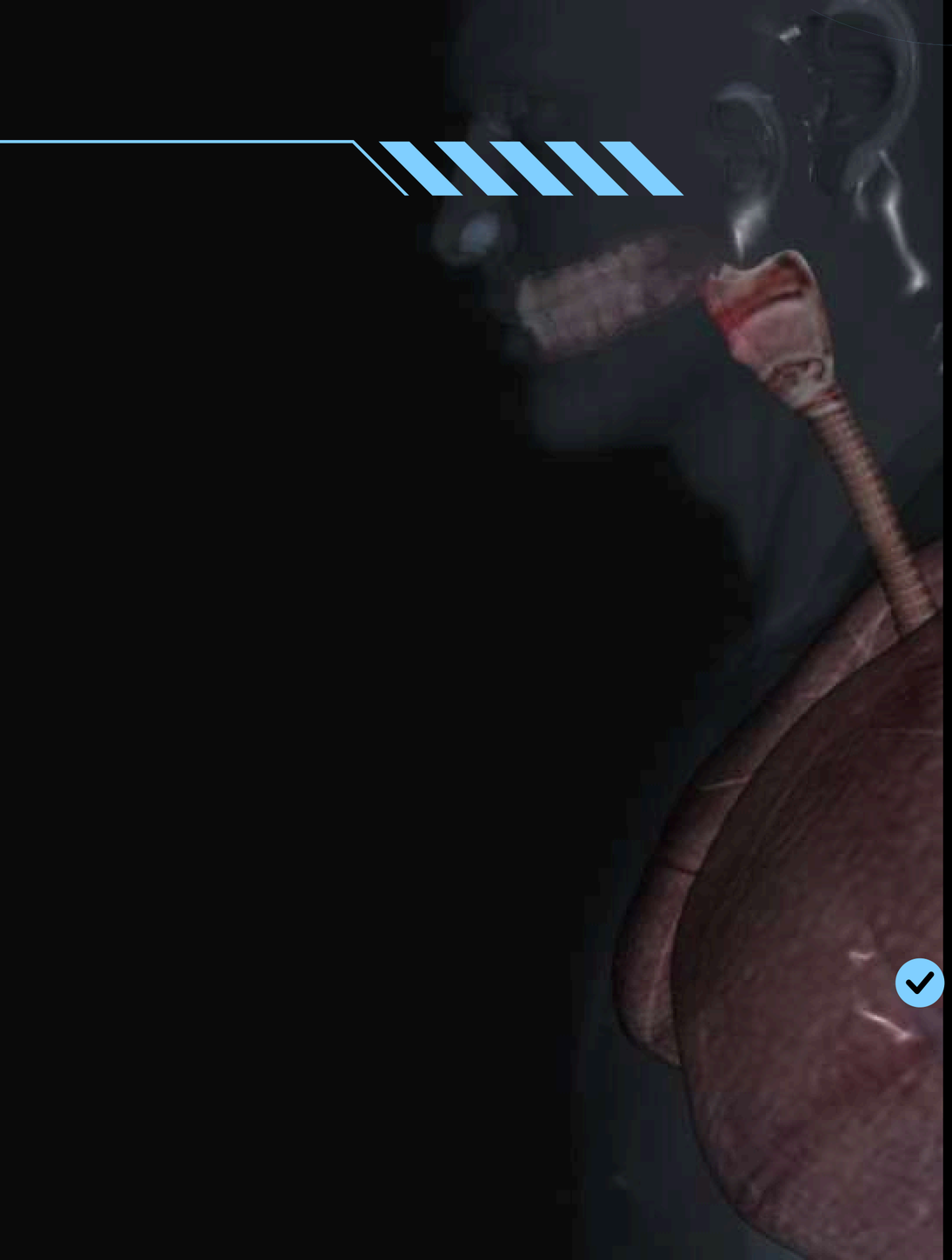
“VNS has demonstrated antidepressant effects in patients with treatment-resistant depression by altering brain activity and neurotransmitter levels.”
– Nemeroff CB et al. Neuropsychopharmacology. 2006;31(7):1345-1355. doi:10.1038/sj.npp.1301082



Brain Functions

Vasodilation improves cerebral blood flow, which is crucial for delivering oxygen and nutrients to brain tissue. Impaired vascular function and reduced perfusion are linked to cognitive decline and the progression of Alzheimer’s disease. Enhancing vasodilation may help protect brain function.

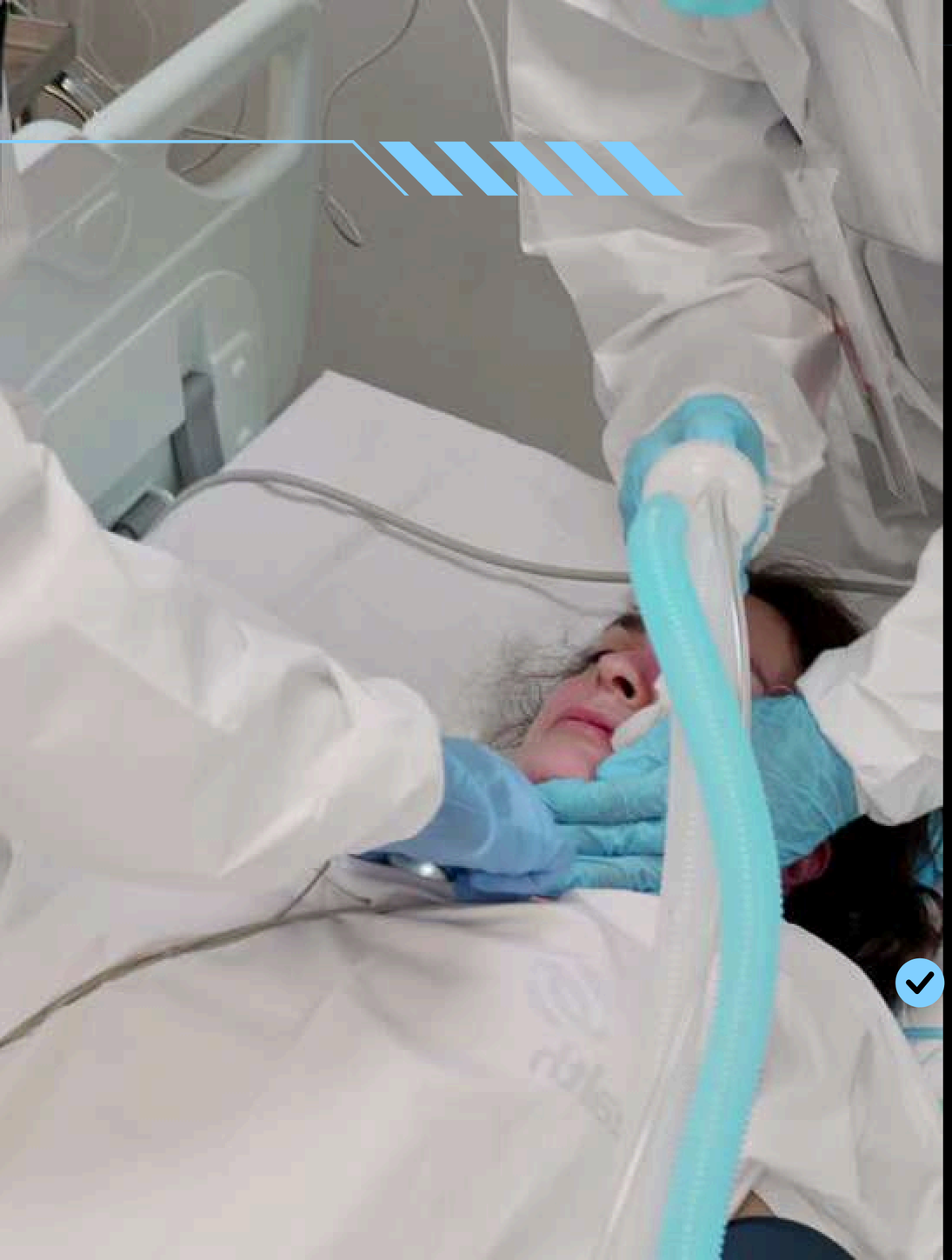
Cerebral hypoperfusion contributes to the pathogenesis of Alzheimer’s disease.”
– Iadecola C. The pathobiology of vascular dementia. Neuron (2013);80(4):844–866. doi:10.1016/j.neuron.2013.10.008



Lung Function

Vagus nerve stimulation (VNS) improve lung function by modulating autonomic control of the airways. It may reduce bronchoconstriction, inflammation, and mucus secretion, particularly in conditions like asthma or COPD.

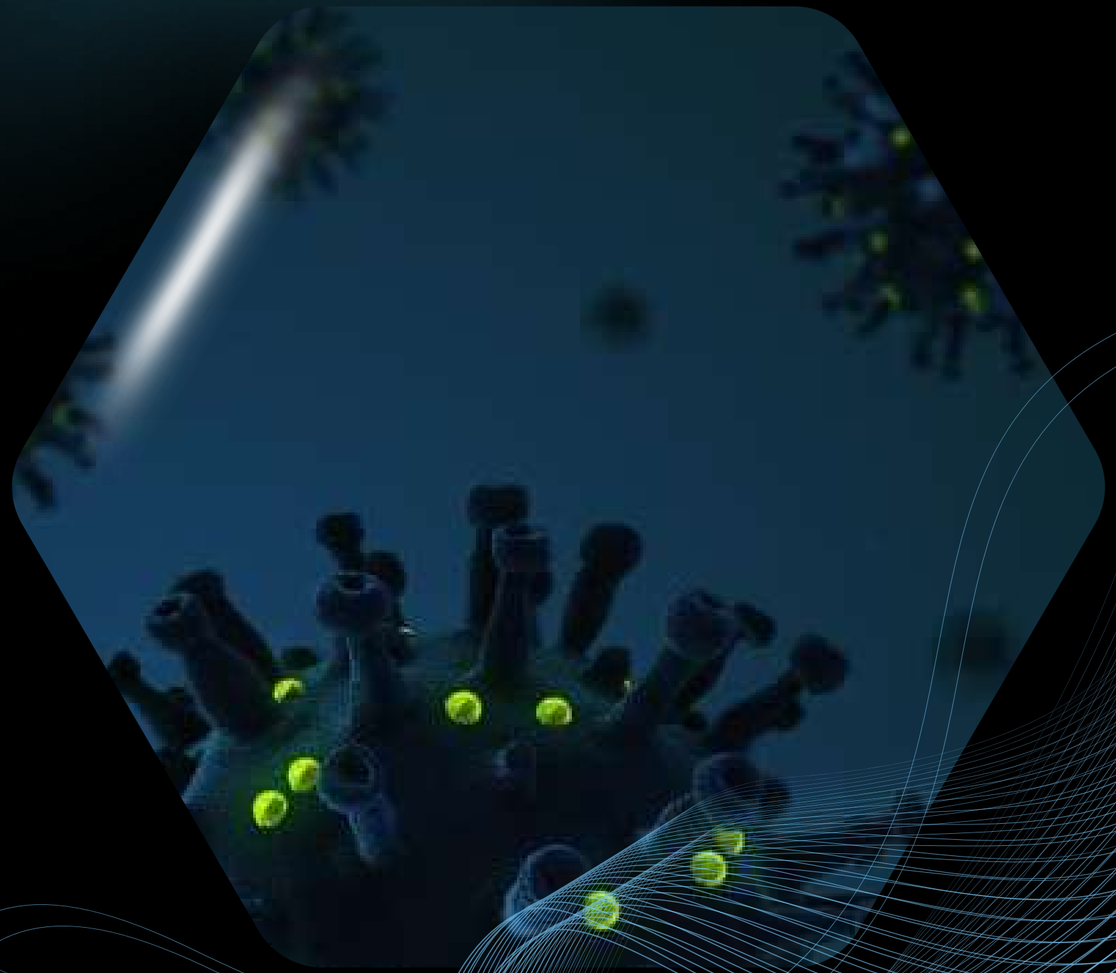
Bonaz B, Sinniger V, Pellissier S. Vagus nerve stimulation: a new promising therapeutic tool in inflammatory bowel disease. J Intern Med. 2017;282(1):46–63. doi:10.1111/joim.12611.



Tetraplegia Ventilator

Immune System

Stimulation of the vagus nerve activates the cholinergic anti-inflammatory pathway, which reduces the release of pro-inflammatory cytokines (e.g. TNF-α, IL-1β). This neuromodulatory effect can suppress systemic inflammation and is being explored for treating autoimmune diseases such as rheumatoid arthritis and Crohn’s disease.



“Vagus nerve stimulation inhibits cytokine production via the cholinergic anti-inflammatory pathway.”
– Tracey KJ. The inflammatory reflex. Nature (2002);420(6917):853–859. doi:10.1038/nature01321

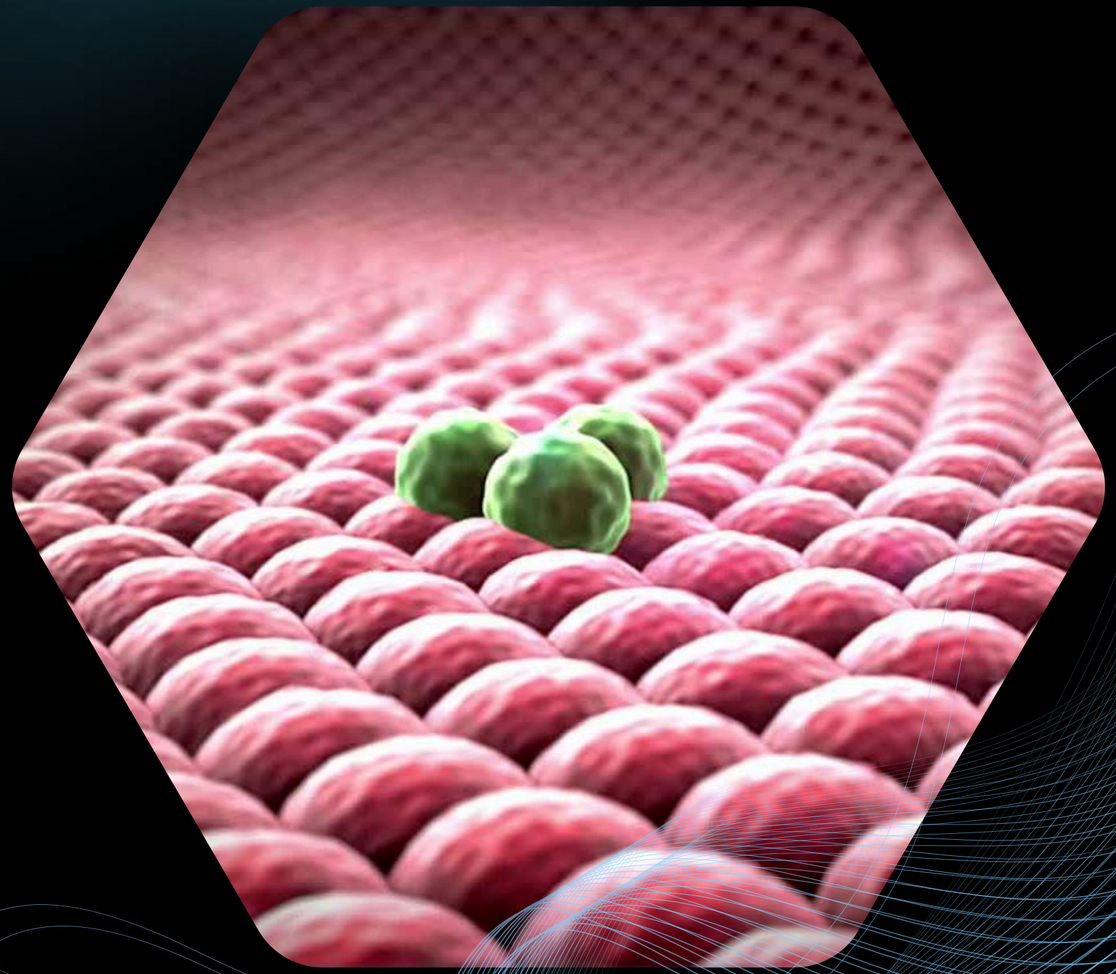
Infections
Sepsis

Vagus nerve stimulation activates the cholinergic anti-inflammatory reflex, which can reduce excessive cytokine release during sepsis. This neuroimmune pathway helps control the systemic inflammatory response, potentially improving outcomes in severe infections and septic shock.

“Electrical stimulation of the vagus nerve inhibits the systemic inflammatory response to endotoxin and improves survival in septic models.”
– Borovikova LV et al. Nature. 2000;405(6785):458–462. doi:10.1038/35013070

Oncology System

The vagus nerve helps regulate inflammation, oxidative stress, and sympathetic overactivity—factors involved in tumor progression. Higher vagal tone has been associated with slower cancer progression and better survival rates in some cancers (e.g. breast, prostate). VNS may support anti-tumor immunity by modulating the tumor microenvironment and reducing chronic inflammation.



“Higher vagal nerve activity predicts better prognosis in cancer patients by inhibiting inflammation and sympathetic activity.”
– Gidron Y et al. Biol Psychol. 2005;74(2):112–118. doi:10.1016/j.biopsycho.2006.07.003

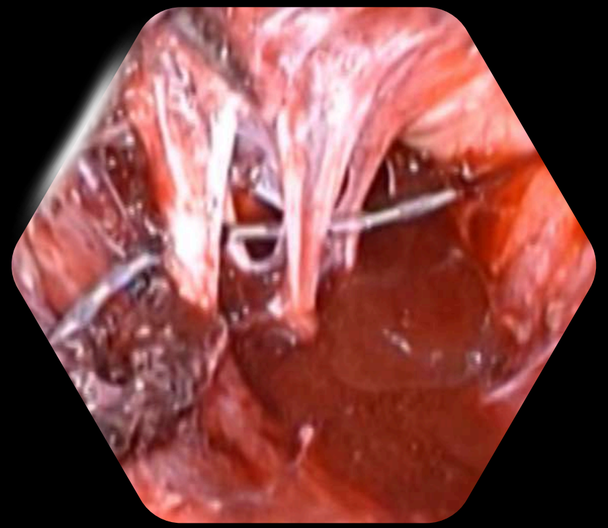
Approach

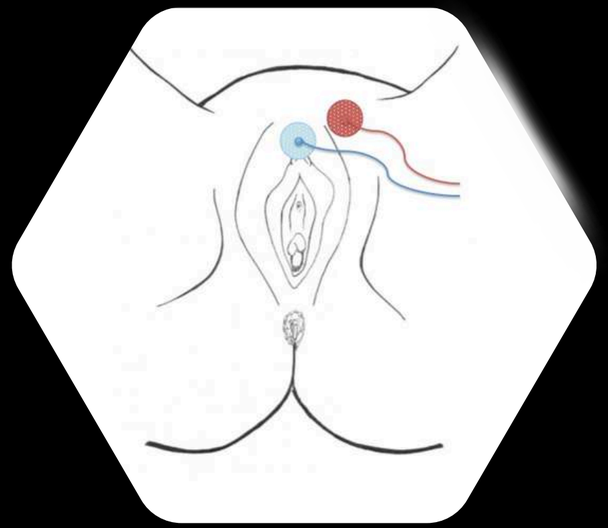
1. Vagus nerve stimulation (VNS) – electrical or manual (e.g., deep breathing, meditation, cold exposure) activates the parasympathetic system, reducing inflammation, heart rate, and stress.
2. Spinal cord or peripheral nerve stimulation – can activate sympathetic or parasympathetic pathways, depending on the target area.
3. Physical exercise – stimulates sympathetic activity during exertion and enhances parasympathetic tone during recovery.
4. Mind-body interventions – practices like yoga, tai chi, and mindfulness enhance parasympathetic balance.
5. Neuromodulation devices – implantable or external stimulators (e.g. for sacral, vagus, or genital nerves) can precisely regulate ANS function.

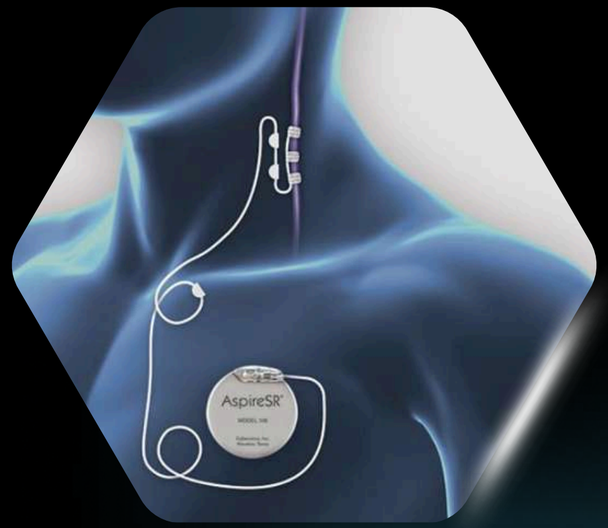
"Non-invasive vagus nerve stimulation has shown potential to modulate autonomic function and reduce systemic inflammation."
– Bonaz B et al. Physiol Rev. 2016;96(2):689–747.
doi:10.1152/physrev.00002.2015

Neuropelveological Entries

LION procedure - GNS procedure - TaVNS







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Vision and Mission

VISION

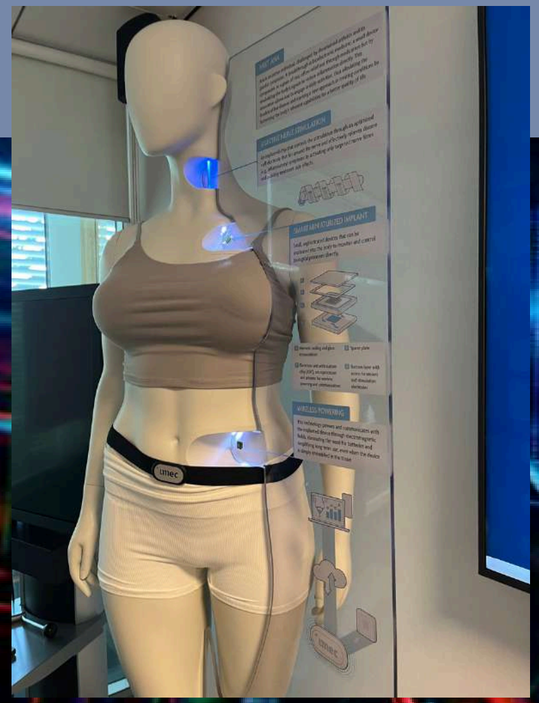
The introduction of GNS and the LION procedure has led to the vision of "e-body."

This concept sees the body as an internal neuromodulation system, using targeted stimulation to restore and optimize pelvic and autonomic nerve functions. It goes beyond symptom treatment, aiming for personalized, adaptive control of complex neurofunctional disorders from within.

MISSION

To advance and disseminate the Neuropelveology through education, clinical innovation, and specialized training.

By empowering physicians with cutting-edge knowledge and surgical expertise in GNS and the LION procedure, we aim to establish e-body as a new standard in the diagnosis and treatment of pelvic and autonomic nerve disorders—restoring function, dignity, and quality of life from within.



Education & Certifications

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