

What is PSTIM

- P-STIM: Peripheral NeuroStimulator
- History
 - Invented in Austria by Dr J.C. Szeles
 - Vascular Surgeon
 - Discovered Multiple Uses (Pain and Perfusion)
- FDA Cleared in 2006 as Auricular ElectroStimulator
 - Recent studies show PENS (Percutaneous Electrical (Vagus) Nerve Stimulator)

Device Specifications

- FDA Cleared for symptom relief of Acute & Chronic Pain
- Product Specifications (IFU)
 - 3 Leads (Needles)
 - 3hr cycle (ON)/3hr rest (OFF)
 - Battery operated – lasts 3-4 days



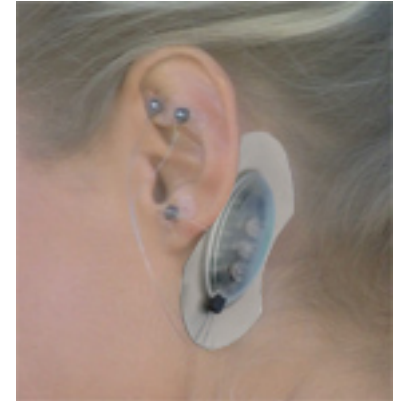
FDA Cleared Indications

- Back Pain
- Cervical Pain
- Sciatica
- Migraine Headache
- Complex Regional Pain Syndrome
- Arthritis and Joint Pain
- Diabetic Neuropathy
- Depression
- Insomnia
- Fibromyalgia
- Shingles



Key Advantages

- Non-Invasive
- No incision required for application
- No risk of anesthesia
- No radiation exposure
- Non-Addictive/Drug-Free
- It can be used during normal everyday activities
- Offers natural pain relief



How does the P-STIM work?

Percutaneous Application of NeuroStimulator

- Leads/Needles access the branch of vagus nerve
- Electrical current sends signals to the brain
- Stimulates parasympathetic systems
- Causes vasodilation
- Enables the body to release endogenous endorphine
- This process balances the ANS which controls pain and perfusion
- Anti-inflammatory effect: decreased CRP and ESR

Mechanism of Action

Vagus nerve, the tenth cranial nerve, arises from the medulla and carries both afferent and efferent fibers.

Modulating effects on the central pain network in the hypothalamus and the limbic system have been proposed

Activation of endogenous opioids (encephalins) in the substantia gelatinosa of spinal grey matter resulting in inhibition of pain signals to the brain

Anti-inflammatory Activities of Vagus Nerve Stimulation

The discovery by [Kevin J. Tracey](#) that vagus nerve stimulation inhibits inflammation by suppressing [cytokine](#) production has led to significant interest in the potential to use this approach for treating inflammatory diseases ranging from arthritis to colitis, ischemia, myocardial infarction, and congestive heart failure.

Action potentials transmitted in the vagus nerve activate the efferent arm of the [Inflammatory Reflex](#), the neural circuit that converges on the spleen **to inhibit the production of TNF and other cytokines** by macrophages there.

This efferent arc is also known as the [Cholinergic anti-inflammatory pathway](#)

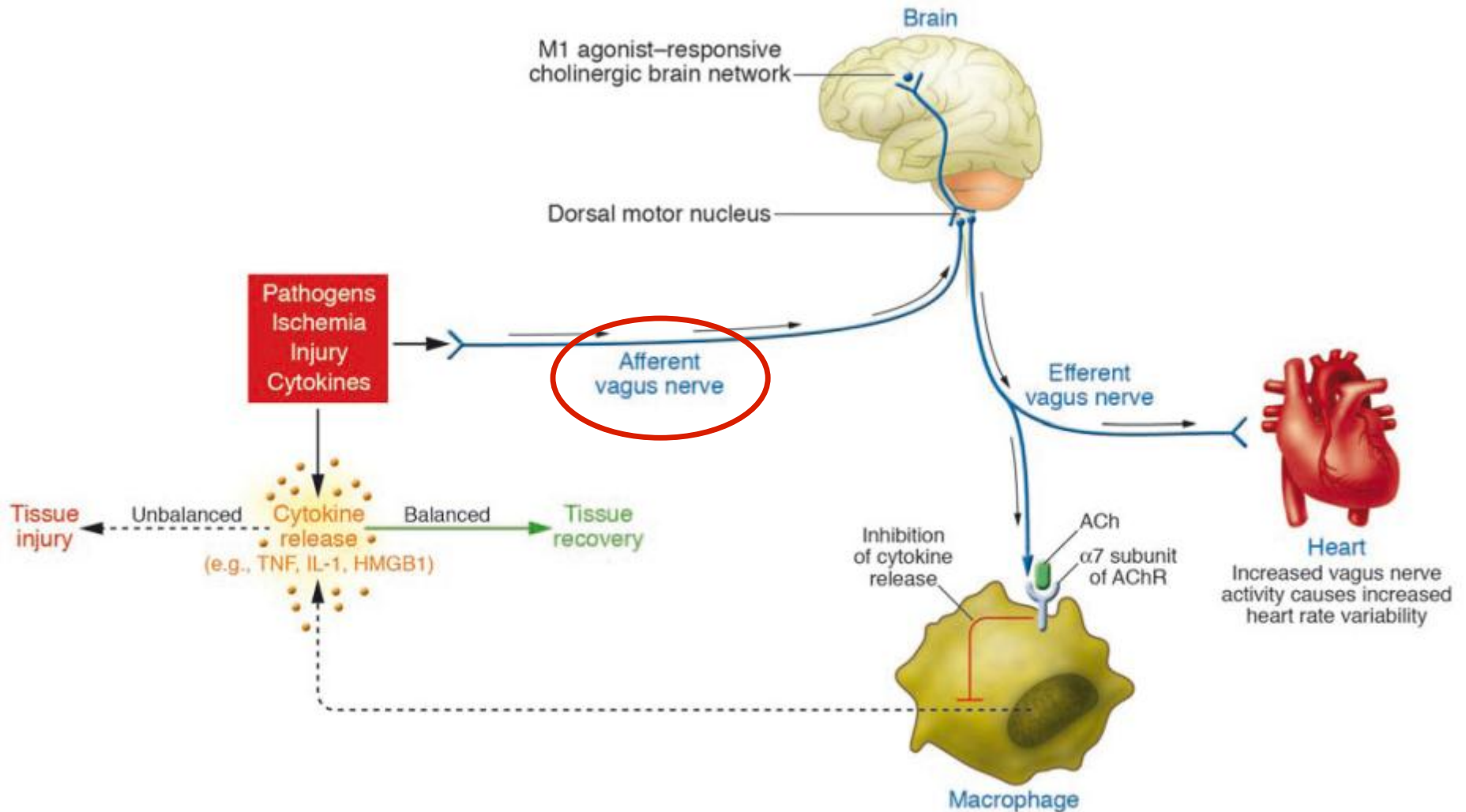
Anti-inflammatory Activities of Vagus Nerve Stimulation

Because this strategy targets the release of TNF, it may be possible to use vagus nerve stimulation instead of anti-TNF antibodies (e.g., [Remicade](#) or [Enbrel](#)) to treat inflammation.

Early-stage medical device company developing the experimental implantable neurostimulation devices for the treatment of inflammation.

A recent study published in *Science* (Sept 15, 2011) demonstrated the existence of [acetylcholine-synthesizing T-cells](#) in the spleen that respond to vagal stimulation, resulting in suppression of inflammatory response / TNF-alpha via macrophages.

The Cholinergic Antiinflammatory Pathway of the Vagus Nerve



Q: How long does each P-STIM treatment last?

- The device cycles an electrical current in 3 hour intervals (3 hours on / 3 hours off)
- Each P-STIM cycle lasts 3-4 days
- After the 4th day, the device is removed by the patient
- Subsequent treatments are recommended after global period of 10 days

Q: How many P-STIM Treatments?

- Each patient is different
- Acute conditions 3-6
- Chronic condistions 9-15
- Dr. Szeles recommends 9-15 treatments

Q: What will I feel during the Procedure?

- Patients will feel a mild tapping or pulsing at the treatment points. The intensity depends on the patient. It is generally very mild and will diminish over the 4 days of the treatment.
- Many patients feel a sense of euphoria and relaxation during the first few treatments while others may not.
- Most patients experience enhanced and more restful sleep

Contraindications

- None
- On insert – Pacemaker and Pregnancy

Q: Will I get an electrical shock if I get the device wet?

Keep the Device Dry

- If the P-STIM device gets wet, it may simply stop functioning.
- If this happens, you should return to your care professional for a replacement device as soon as possible.

Q: How long will I feel the effects after I take off the P-STIM device?

- Understanding that every patient reacts differently, it is not uncommon for the effects to last for months or years and in some cases much longer given the normal course of treatment is followed.
- If or when pain does return the next course of treatment is normally an abbreviated one.