

## NUCALM TECHNOLOGY OVERVIEW

Stress is defined as a physical, chemical, or emotional factor that causes physical or mental tension that can alter an existent equilibrium and is a major factor in disease causation. Stress, anxiety, and inflammation are part of the human condition and are known to cause chemical and structural changes in every system in the body including the nervous system, circulatory system, endocrine system, and digestive system. Each of us copes with stress in different ways, but stress is universally damaging to cells and is a precursor and catalyst to numerous disease states. To maintain a healthy system you must eat a healthy diet, perform regular exercise, effectively manage stress, and achieve autonomic nervous system balance through restorative sleep.



NuCalm® is the first and only patented system for “balancing and maintaining the health of the human autonomic nervous system.” Through biochemical and electrical signaling NuCalm mimics the body’s own process for preparing for sleep, naturally bringing brain wave function to the pre-sleep state of consciousness (alpha and theta stages of sleep). Simply put, NuCalm is like “meditation in a box.” NuCalm suspends the body in the parasympathetic nervous system dominant state - the only time the body is capable of regeneration and repair. Use of NuCalm allows your body to restore cellular health, resolve neuromuscular tension, increase mental acuity, enhance sleep stability, increase energy levels, improve stress resiliency, regulate circadian rhythm, and improve overall health and wellness.

*“You could just tell that these guys were just more relaxed and they would tell me that. We want our players to play ‘intense’ not ‘tense’ and NuCalm is a way for them to just relax and deal with frustrations. NuCalm was very beneficial because it clears your head and allows you to start from scratch. The crucial part of this game is recovery. That’s why I think NuCalm played an important role for us, especially during the playoffs.”*

— Mike Gapski, Head Trainer of the Chicago Blackhawks, 2015 and 2013 Stanley Cup Champions



## NUCALM SYSTEM

NuCalm's patented system neutralizes acute, episodic stress and balances the autonomic nervous system by using the brain's two communication channels:

- **Chemical channel:** NuCalm dietary supplements and CES work together to neutralize the chemistry of the stress response (controlled by the Hypothalamic-Pituitary-Adrenal axis)
- **Electrical channel:** NuCalm neuroacoustic software paces brain wave function - brings beta or high beta brain wave function down to the alpha/theta range (first stages of sleep)

## NUCALM COMPONENTS - ORIGIN

NUCALM COMPONENT	PURPOSE	ORIGIN	FDA GUIDANCE	CONTRAINDICATIONS
Dietary Supplements	Interrupt adrenaline response	Gamma-Aminobutyric Acid (GABA), the primary ingredient, was discovered in 1950 by Eugene Roberts and J. Awapara	GRAS - Generally Recognized as Safe by the FDA	Pregnant and nursing women
Cranial Electrotherapy Stimulation (CES) Device	Open GABA receptor sites for rapid uptake of GABA	Discovered in the 18th century; expanded research began in the Soviet Union in 1949	FDA-cleared device to treat anxiety, depression, and insomnia	People with a pacemaker, ventricular assist device (VAD), or brain implant
Neuroacoustic Software	Pace brain wave function	Discovered in 1839 by a German scientist; expanded research began in the 1930s	N/A	People who are deaf and cannot use hearing aids
Light-Blocking Eye Masks	Reduce stimulation of the optic nerve	Unknown	N/A	People with claustrophobia

## NUCALM COMPONENTS - DESCRIPTION

NUCALM COMPONENT	DESCRIPTION
<p>Dietary Supplements</p> 	<p>The NuCalm dietary supplements work on the GABAergic system to interrupt the “fight-or-flight” response and begin relaxing the brain and body. The main ingredients in the dietary supplements are a proprietary blend of Gamma-Aminobutyric Acid (GABA A) and 4-Amino 3-Phenylbutyric Acid (GABA B), L-Theanine, and Casein Tryptic Hydrolysate.</p> <p>The proprietary NuCalm dietary supplements are regulated by the FDA under GRAS (Generally Recognized as Safe). The ingredients have all been tested for allergies and sensitivities and will not counteract or interfere with any medications or dietary restrictions.</p>
<p>CES Device</p> 	<p>The NuCalm CES device produces a mild, sub-sensory electrical current (less than 1/10,000 of an Ampere). Research shows this device helps to balance the brain’s neurochemistry by reestablishing optimal neurotransmitter levels. This device has been cleared by the FDA for the treatment of anxiety, depression, and insomnia.</p> <p>Combining the CES stimulation with precursor neurotransmitters (NuCalm dietary supplements) causes a profound state of relaxation and anxiolysis. Quantitative EEG’s show a slowing of brain wave activity from high beta (high alertness) to alpha frequencies (associated with deep meditation).</p>
<p>Neuroacoustic Software</p> 	<p>The NuCalm proprietary neuroacoustic software uses complex binaural beats and frequency-following-response technologies that initiate a change in brain wave frequencies. Research indicates a scientifically validated neurophysiologic response is initiated when an auditory pacing signal is presented to the brain. The development of NuCalm required significant advances in the design of binaural and monaural beat sound acoustics, which are overlaid with classical music and presented using an integrated headset.</p> <p>The neuroacoustic brain entrainment software paces brain waves from the high brain wave frequencies associated with stress (23 Hz - 38Hz) to brain wave frequency patterns of alpha and theta (4 Hz - 12 Hz) associated with relaxation and deep meditation.</p>
<p>Light-Blocking Eye Masks</p> 	<p>The light-blocking eye masks reduce stimulation of the optic nerve resulting in an immediate increase (up to 30%) in alpha waves in the visual cortex of the brain. This helps maintain deep relaxation.</p>



## NUCALM SYSTEM: COMPONENT DETAILS

### NuCalm Dietary Supplements

The NuCalm proprietary orthomolecular formula has been developed and engineered over several years to maximize the body's natural relaxation response with NuCalm. The proprietary formula is only available in the NuCalm system and includes structured nutrient-sourced building blocks that rapidly enter the brain and convert to powerful messengers that interrupt the stress response. The NuCalm dietary supplements work on the GABAergic system to counteract adrenaline and begin the relaxation response. The primary ingredients include:

- **Gamma-Aminobutyric Acid (GABA)** – an inhibitory neurotransmitter that promotes a natural state of calm and deep relaxation
- **L-Theanine** – a non-protein amino acid found in tea plants (*Camellia Sinensis*) that supports the formation of GABA

### GABA

GABA is the primary inhibitory neurotransmitter that reduces the excitability of neurons. Over-stimulated or over-active neurons may lead to feelings of restlessness, irritability, and sleeplessness. GABA is naturally produced from the amino acid glutamine and the sugar glucose. It is concentrated in the midbrain region and is known to play a role in healthy pituitary function, which helps maintain hormone synthesis, proper sleep cycles, and body temperature.

GABA inhibits nerve cells from over-firing to promote feelings of calmness and stability.

GABA is one of the few amino acids that can pass through the blood-brain barrier when administered orally. The GABA<sub>A</sub> and GABA<sub>B</sub> receptor sites are located in the same area as the brain receptor sites for benzodiazepines, barbiturates, and alcohol.

### L-Theanine

L-Theanine is an amino acid that has been shown to promote a general calming effect. The natural effects of L-Theanine include:

- Stimulating the production of alpha brain waves
- Protecting and restoring the brain
- Inducing deep states of relaxation
- Up-regulating GABA – increasing its clinical efficacy and relaxation effect

Studies show that L-Theanine plays a role in inducing the same calm and feeling of well-being as meditation, massage, or aromatherapy.



## Cranial Electrotherapy Stimulation (CES)

The Cranial Electrotherapy Stimulation (CES) device produces electrical current of 1/10,000 of an amp - which is close to the cell's own electrical values. This device has been cleared by the FDA for the treatment of anxiety, depression, and insomnia. Research over the past 60 years indicates an increase in metabolism of neurotransmitters as evidenced by an increase in the metabolites of the neurochemicals. Other research points to a normalization and balance of the brain's neurochemistry by reestablishing optimal neurotransmitter levels. Low-level electrical current interacts with cell membranes to produce modifications in information transduction associated with classical second messenger pathways. Studies have found that a small amount of the CES current reaches the thalamic region of the brain and facilitates the release of neurotransmitters.

CES studies show reduced rigidity in the central nervous system stimulation process and enhanced activity of the alpha-rhythm generating systems.

Combining CES with precursor neurotransmitters causes a profound state of relaxation and anxiolysis. Quantitative EEG's show a slowing of brain wave activity from beta (high alertness) to alpha-theta frequencies.

## Neuroacoustic Software

The proprietary neuroacoustic software provided in the NuCalm system uses binaural beats and Frequency-Following-Response (FFR) that initiate a change in the pace of brain waves. According to extensive research, a scientifically validated neurophysiologic response is initiated when an auditory pacing signal is presented to the brain. Solace Lifesciences has developed significant advances in the design of binaural and monaural beat sound acoustics, which are embedded in soothing music and presented using an integrated headset.

### EEG Brain Wave Frequency Correlations

- **High Beta (23-38Hz)** — associated with fear and anxiety
- **Beta (13-30Hz)** — associated with day-to-day wakefulness
- **Alpha (8-12Hz)** — associated with relaxation, meditation, and idleness (Alpha/Theta crossover events occur just as pre-sleep)
- **Theta (4-7Hz)** — associated with restorative sleep and lost sense of time and place
- **Delta (0.5-3Hz)** — associated with deep, dreamless sleep



The neuroacoustic brain entrainment software paces brain waves from the high beta brain wave frequencies associated with stress and anxiety (23 Hz-38 Hz) to brain wave frequency patterns of alpha and theta (4 Hz-12 Hz). These alpha brain waves are associated with deep relaxation and calmness. Theta brain waves are associated with deep meditation, restoration, and lost sense of time and place.

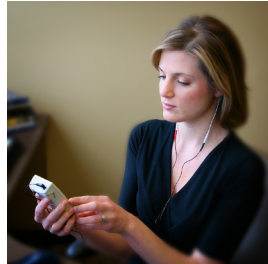
Binaural beats are auditory brainstem responses, which originate in the superior olivary nucleus of each hemisphere. They result from the interaction of two different auditory impulses, originating in opposite ears, registering below 1,000 Hz and which differ in frequency between one and 30 Hz (Oster, 1973). For example, if a pure tone of 300 Hz is presented to the right ear and a pure tone of 312 Hz is presented simultaneously to the left ear, an amplitude modulated standing wave of 12 Hz, the difference between the two tones, is experienced as the two wave forms mesh in and out of phase within the superior olivary nuclei. This binaural beat is undetected by the ears (the human range of hearing is from 20-20,000 Hz). It is perceived as an auditory beat, and can be used to entrain specific neural rhythms through the frequency-following-response, thus modulating the brain wave frequency in the case of NuCalm between 4 Hz-12 Hz.

## NUCALM PROTOCOL

The NuCalm experience takes less than 4 minutes to set up and approximately 3-5 additional minutes before deep relaxation is achieved.



**Step 1:**  
**Chew Supplements**



**Step 2:**  
**Apply CES**



**Step 3:**  
**Fit Headphones**



**Step 4:**  
**Pull Down Eye Mask**

NuCalm guides you to deep relaxation and allows your body to restore and regenerate organically. On NuCalm, your mind will wander, your breathing will deepen, your body will feel heavy, and you will lose track of time. The neurophysiological impact of NuCalm is characterized by:

- Rapid induction of a parasympathetic hypnogogic dissociative state
- Sustained, steady parasympathetic nervous system dominance
- Rapid return to full cognition post NuCalm experience

By triggering your body's natural process for 'winding down' and preparing for sleep, NuCalm guides you to parasympathetic nervous system dominance (your natural healing state). NuCalm helps your body restore cell health, balance internal systems, release neuromuscular tension, increase mental clarity and focus, improve mood, increase energy, build resiliency to stress, improve the quality of restorative sleep, and helps you live better.