

# **THERALIGHT TRAINING MANUAL**



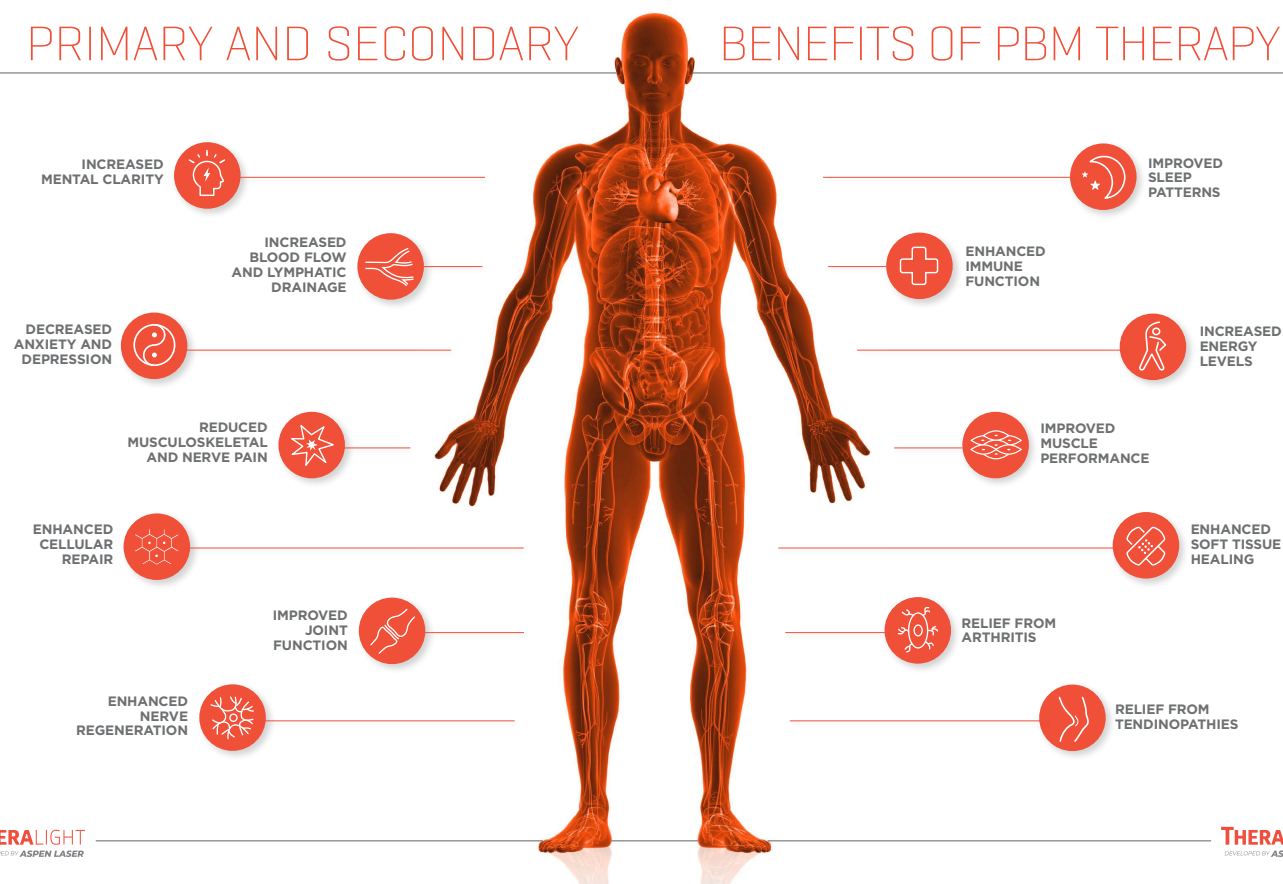
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# What is Photobiomodulation Therapy?

- Application of very specific colors of light to cells that are
  - sick
  - injured or
  - at risk of dying
- resulting in reduction of chronic inflammation and chronic Oxidative Stress
  - Allowing for natural return to homeostasis; a state of equilibrium and optimal conditions for optimal cellular health.
  - Resulting in an increase in rate and quality of healing at a cellular level.

## PRIMARY AND SECONDARY BENEFITS OF PBM THERAPY



## What is Chronic Oxidative Stress?

- State of imbalance between the elevated production of Reactive Oxygen Species (very volatile free radicals) and the body's ability to reduce or remove the damage they causes at a cellular level.
  - Small levels of ROS are good for the cell, triggering naturally healing processes
  - Elevated levels of ROS can be very damaging to the cell
- Commonly considered the underlying cause of disruption in normal cell signaling resulting in accelerated cellular aging and cell degeneration resulting in disease.



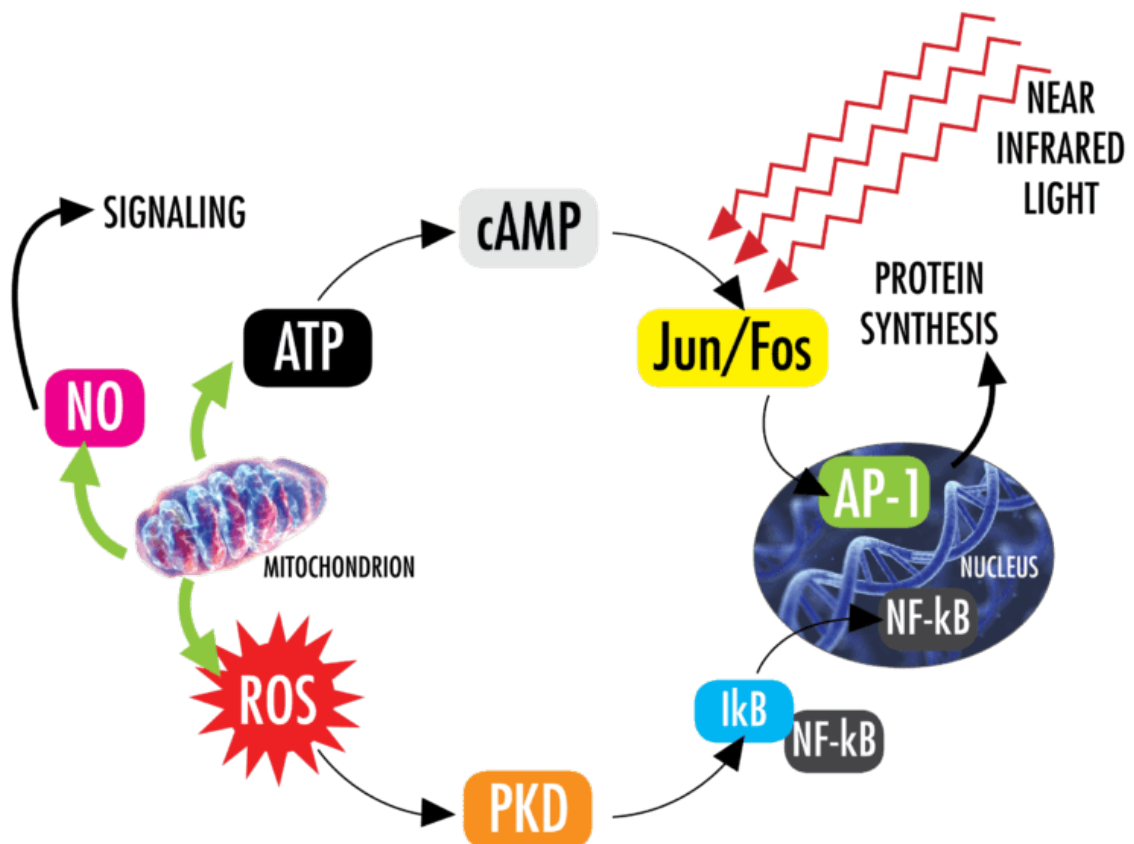
## What Causes Oxidative Stress?

- This process begins in the Mitochondria, the power plant of the cell.
  - Mitochondrial Nitric Oxide (mNO) is a free radical molecule that is present in very small quantities and acts as a cell signaler in the energy production pathway.
  - When a cell is under stress, the mitochondria begin to produce excess mNO. The larger the stress/trigger, the more mNO is produced.
  - This excess mNO binds with an enzyme called Cytochrome C Oxidase (CCO).
    - CCO is the terminal enzyme in the electron transport chain, the energy production cycle of the cell.
    - It is the site that oxygen binds to in the process of energy production.
- When CCO is inappropriately bound up by a free radical called Mitochondrial Nitric Oxide, Oxygen cannot attach, resulting in hypoxia (low or absent levels of oxygen).
  - This hypoxia, depending on severity, triggers the elevated production of ROS.



## How does PBM reduce Oxidative Stress?

- It breaks the cascade that causes ROS to be produced in excessive quantities.
  - The absorption of the light displaces a free radical (mNO) that is inappropriately binding there, causing hypoxia at a cellular level
  - The released mNO is absorbed by local blood vessels
  - Results in vasodilation which Increases circulation locally
  - The O<sub>2</sub> available now is Able to attach to the CCO allowing Energy production(ATP) to resume
  - The imbalance is removed and the result is a restoration of homeostasis.
  - The ensuing downstream chemical cascade results in natural, cell specific tissue repair.



# What Parameters affect client outcomes?

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## Color - Wavelength

- Measured in nanometers (nm)
- Represents how many times the wave repeats per second
- Is the medicine of light
  - Determines where the light is absorbed
  - Determines how deep the light penetrates

## Intensity / Irradiance

- Measured in milliwatts per centimeters squared (mW/cm<sup>2</sup>)
- Represents the intensity of the light source at the treatment surface
  - Affected by the inverse square law principal of physics
    - Light gets exponentially weaker as it moves away from the diode emitting
  - Affected by the scattering principal of physics
    - Light gets scatters 30 degrees in every direction as it penetrates into tissue reducing intensity as the beam widens and deepens
- Light has a BiPhasic dose response. Tissue response to the therapy determined by the intensity of the light source at the target.
  - Low intensity (0-300mW/cm<sup>2</sup>)
    - stimulates tissue repair in all tissue
    - **The TheraLight delivers 100mW/cm<sup>2</sup> at patient level**
  - Moderated intensity (300-750mW/cm<sup>2</sup>)
    - Stimulates tissue repair in muscles and ligament
    - Inhibits nerve tissue activity temporarily without causing damage
  - High intensity (>1000mW/cm<sup>2</sup>)
    - has a heating or thermal effect that is intended to burn, cut or ablate tissue.
- Pulsing at a 50/50 duty cycle reduces irradiance by 50%

## **POWER / Quantity of light**

- Measured in watts (W)
- Represents how many photons of light are available for absorption
  - Each cell has 100,000 to 600,000 CCO receptor sites
  - Large quantities of light must be available for adequate tissue saturation
  - The TheraLight delivers 4500W while operating

## **Pulsing - Hz**

- Measured in hertz (Hz)
- Represents how many times the light is turned off and on per second
- Slightly increases depth of penetration
- Studies have shown that pulsing appears to be more efficacious than others in triggering desired biological outcomes, however this is not yet well understood.
  - The general findings seem to imply that that cells require time / pauses to absorb and handle photons. To date, the literature does not draw any correlation between pulse frequency and pathological condition. They found that no particular frequency appears to be more or less effective than others
  - However if there is a biological explanation of the improved effects of pulsed light it is arguably due to some fundamental frequency that exists in biological systems. Two possibilities for what these biological processes could actually caused by are offered:
    1. As indicated previously, the primary mechanism of action of LLLT on a cellular level is the photodissociation of nitric oxide from a protein binding site cytochrome c oxidase. Research indicates it is likely that the mNO would rebind to the same site in the presence of continuous light. Therefore if the light was pulsed multiple photodissociation events could occur, while in CW mode the number of dissociations may be much smaller.



2. All systems in the human being, from the atomic to the molecular level, are constantly in motion-creating resonance. For example, it is known that brains have waves of specific frequencies. Electroencephalography studies have identified four distinct classes of brain waves.
  - Alpha waves (8-13 Hz) occur in adults who have their eyes closed or who are relaxed.
  - Beta waves (14-40 Hz) mainly occur in adults who are awake, alert or focused.
  - Delta waves (1-3 Hz) occur mainly in infants, adults in deep sleep, or adults with brain tumors.
  - Theta waves (4-7 Hz) occur mainly in children ages 2-5 years old and in adults in the twilight state between sleeping and waking or in meditation.
- Energy Medicine, is the suggestion that the use of subtle energy can be used to treat energetic imbalances, bringing the body's systems back to homeostasis (balance). The possibility of resonance occurring between the frequency of the light pulses and the frequency of the brain waves may explain some of the results with transcranial LLLT using pulsed light.

## What is TheraLight

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Backed by years of extensive engineering and clinical research, the TheraLight 360 has evolved to become the most advanced, versatile and effective full-body light therapy system on the market. The TheraLight 360 system utilizes exclusive photobiomodulation technologies to deliver maximum tissue saturation, regardless of skin color or body type. By combining beautiful design, cutting-edge technology and precision craftsmanship, the TheraLight 360 has set the standard for full-body light therapy systems.



## What does Full Body PBM feel like?

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PBM Therapy does not heat tissue, it does however increase circulation so a warming sensation is often experienced. Reported subjective feedback includes but is not limited to:

- "Temporary euphoric feeling"
  - "Increased energy levels"
  - "Improved sleep patterns"
  - "Improved mood"
  - "Improved skin clarity and tone"
  - "Improved bowel function"
  - "Decreased swelling of extremities"
  - "Increased energy"
  - "Increased mental clarity"
  - "Increased general sense of well being"
- These outcomes may not apply to every person, and are not intended to guarantee, promise, represent and/or assure that anyone will achieve the same or similar results.
  - Occasionally some clients may experience mild fatigue, discomfort, or aches after treatment. These responses should reduce after 24-48 hours.

## Are there negative side effects?

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Many therapies only address symptoms, without addressing the source. PBMT works at the cellular level, stimulating repair and normalizing cell function.

- Unlike drugs and surgery, PBM Therapy safely and effectively promotes cell
- PBM Therapy is Non toxic, non invasive, and has no negative side effects.
- Occasionally some clients may experience mild fatigue, discomfort, or aches after treatment. These responses should reduce after 24-48 hours. These are referred to as “retracing”. Often times chronic conditions will move back through the acute phase in the healing process. Although not always pleasant, these signs are indications of natural healing and are not harmful.
  - If you believe a client is has a significant likelihood of retracing based on health history, start with 1/2 the recommended time, then work up in 1-2 minute increments until the full session time in minutes is reached.
  - If at any time during the staging process the client begins to feel the symptoms of retracing, reduce time by 1-2 minutes and remain at that setting for 1 week.
  - As long as there are no increase in retracing symptoms, continue adding 1-2 minutes at each subsequent visit until the full session time in minutes is reached.

## Do I need eye protection?

- The TheraLight has been independently tested for safety and no protective eyewear is required if no corrective eyewear is being worn.
- All persons present wearing prescription contacts or glasses during device operation are recommended to remove those items or wear approved TheraLight 360 protective eyewear.

## Who should not use PBM?

- Contraindications
  - Pregnancy
  - Clients that have had organ transplant medications
- Precautions
  - Under 18 requires parental consent
  - Clients with cancer
    - Encourage to consult with their oncologist
    - Must sign informed consent
  - Clients with light sensitive seizure disorders
    - Cover eyes with dark cloth before turning on light bed
    - Must sign informed consent

## Who typically adopts PBM Therapy?

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- Athletes
  - Shorter post exercise recovery time at a cellular level
    - as low as 6-12 hours post total muscle failure
  - Reduced delays onset muscle soreness
  - Greater muscle torque/strength
  - Reduced risk of injury
  - Faster recovery from injury
- People interested in health maintenance and Anti-aging
  - People who consistently schedule wellness into their lives
    - Exercise
    - Good nutrition
    - Stress reduction
- People interested restoration of health
  - management or reduction of symptoms of disease or inflammatory conditions as cells become healthier

# PROTOCOLS AND TABLET OPERATIONS

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## Pulse Setting considerations

- The TheraLight has the capability of pulsing from 1 to 5000Hz
- 10Hz has the most published research to support efficacy.
- Found on the World Wide Web are interesting Hz frequencies in sound and light and their supposed benefits. These are not endorsed by TheraLight, only provided for your information.

To date the literature on the science of Photobiomodulation Therapy has not identified any particular frequencies to be more or less effective than others.

In an effort to offer guidance, we are listing frequencies present in the literature as well as those identified by Dr Paul Nogier as suggested pulse settings for our clients to utilize with the TheraLight as they choose. These are not in any way to be considered medical advice, nor are they presented as a replacement for drugs, surgery or other therapy.

Paul Nogier (3 July 1908 - 15 May 1996) was a French neurologist and physician who discovered and developed a technique called auriculotherapy; ear acupuncture. In 1990, in Lyon, the World Health Organisation held up a working group on the standardization of the nomenclature of the auricular points. This group was presided by Dr. Raphaël NOGIER and standardized 43 points. Also in the 1970s, Dr Nogier identified Seven frequencies he used as bioresonance therapy for conditions that occur due to impaired cellular activity.

## Brain Wave Pulse Rates

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Gamma - 40 Hz - Concentration - Cognitive Health

Beta - 20 Hz - Anxiety dominant, active, external attention, relaxed

Alpha - 10 Hz - Very relaxed, passive attention

## Sound Wave Therapy Pulse Rates

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528 Hz - vibrates at the same frequency as our heart and our DNA

## The Nogier Frequencies

Below are from the work of Dr Paul Nogier who is credited with mapping the auricular accupoints. He suggested that these pulse rates would enter into resonance with tissue to exert effects on the body

### 73 Hz Hormone Balance

- Resonates with the sub-cortical or lower regions of the brain. including the thalamus and hypothalamus—twofold major control centers for body functions.
- May also help with muscle spasms, facial pain, headaches and depression.
- Has been used for non-healing bone fractures and to help balance hormones. Veterinary experience: Improves circulation.

### 146Hz - Brain activation intelligent tissue :

Resonates with the cerebral cortex of the brain—involved with thinking, imagining and creating.

- May improve memory
- May improve symptoms associated with psychological disorders
- May reduce nervousness and worry.
- May reduce inflammation and scar tissue on tendons and ligaments, reduces edema and improves gums

This is a universal frequency that can be tried to any condition.

### 292Hz - Cellular Vitality :

Resonates with the Ectoderm (outermost tissue) that forms skin, glands, nerves, eyes, ears, teeth, brain and spinal cord.

- May improve wound healing
- May improve skin texture and conditions
- May improve nerve repair



- May reduce scar tissue
- May reduce Inflammation

This is a universal frequency that can be tried to any condition.

### **584 Hz - Autonomic nerve balance :**

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Resonates with Endoderm (innermost tissue) that forms the lining of the intestinal tract, the lungs, the bladder, the urethra, and the auditory tube. It also forms the thyroid, thymus, liver, gall bladder and pancreas.

- May improve nutritional assimilation
- May improve allergy problems
- May balance the parasympathetic nervous system
- May improve circulatory problems
- May reduce edema,
- May improve lymph problems

### **1,168H - Muscle and blood circulation:**

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Resonates with Mesoderm (middle tissue) that forms connective tissue such as ligaments, tendons, cartilage, muscle, and bone.

It also forms the heart, blood and lymph vessels, kidneys, ovaries, testes, spleen, and the cortex of the adrenal gland.

- May reduce muscle, skeletal and myofascial pain.

### **2,336 Hz - Mind and body stress adjustment:**

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- May balance the two sides of the brain.
- May reduce stress

Try **2,336 Hz** if chronic condition related to **1,168Hz** is not improving.

Try **2,336 Hz** if a chronic condition related to **292Hz** is not improving.

### **4,672Hz - Peripheral Nervous System:**

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Resonates with the spinal cord and peripheral nervous system

- May improve spinal
- May improve skin disorders
- May improve pain control
- May reduce excess calcification such as bone spurs and arthritic joints

**This is a universal frequency that can be tried to any condition.**

## Time and Interval

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### Recommendations for the TheraLight

- 10 - 15 minute sessions
  - 10 - alert and energized
  - 12-15 - relaxed / parasympathetic response
  - Maximum 1x daily (any time of day)
  - Pulsed
  - 2-3 times per week for health maintenance / AngiAging
  - 4-6 times per week for health improvement / healing
- If recovering from an injury
  - 10 - 20 minute sessions
  - 2x daily x 1-2 weeks
    - early am
    - late afternoon
  - Pulsed

## Client Experience

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A product orientation is encouraged. The following should be reviewed with the client prior to their first session in the TheraLight Chamber

- The Red E-Stop button is for staff use only. Please do not press the button while using the Chamber unless an emergency exists.
- The Green Power button is for staff use only. Please do not power off the TheraLight Chamber after your session.
- The acrylic is not designed for pressure. Please do not press the lid open using the acrylic as pressing on the upper acrylic panel can dislodge it.. Please press up on the silver frame or the silver handle inside the frame or the handle on the outer rail, when opening and closing the door.
- The acrylic pillow is designed for comfortably resting your head on during the session. Light cannot penetrate tradition pillows or bolsters.
- The bed and goggles will be cleaned thoroughly with an approved cleaning solution by our staff after each session.
- If you have discomfort lying flat, feel free to bend your knees and lie with feet flat on the acrylic. You may also lie on your side or on your stomach.
- Light cannot penetrate clothing so it is optimal for no clothing to be worn. As such prior to using the TheraLight you will be asked to disrobe to your level of comfort.
- The therapy time will be set by the staff. The only button you will need to press is the play button.
- Once you disrobe to your comfort level and position yourself comfortably in the bed, press the staff alert button on the frame of the TheraLight Chamber to notify staff they can initiate the therapy.
- For optimal outcomes, it is suggested you are adequately hydrated. Recommended water intake is 80-100 oz per day.
- If the pulse rate setting is less than 50 Hz, the light will have intermittent flashing. If you have a seizure disorder that is light sensitive you will want to cover your eyes completely PRIOR to the unit turning on. Please cover your eyes with a dark cloth, eye pillow or goggles provided.

- You may hear a crackling during your session, this is normal as the acrylic often expands as it warms slightly.
- When the Session is complete, the unit will turn off automatically. Please use the handle on the outer rail to open the lid to exit the TheraLight Chamber. Please exit the bed, get dressed and notify the staff that you are finished.

**Q: Is The TheraLight FDA Approved?**

**A: The TheraLight is FDA Registered**

- The TheraLight 360 Full Body Wellness System is a General Wellness Device. General Wellness Devices are exempt from premarket notification (510k). Therefore, the TheraLight 360 Full Body Wellness System does not require FDA clearance or approval, instead must be registered with the FDA under defined Intended Uses. The device is built according to current Good Manufacturing Practices (cGMP) and is in compliance with applicable standards as required by FDA.
- THE CLASS I INTENDED USES ARE:
  - Restoration of motion to joints
  - Redevelop muscles
  - Adjunct to obesity as part of a diet and exercise program
- THE CLASS II INTENDED ARE:
  - Relaxation of muscles and relief from muscle spasms
  - Temporary relief of minor muscle and joint aches, pain and stiffness
  - Temporary relief of minor pain and stiffness associated with arthritis
  - To temporarily increase

**Q: Can it hurt me if I go longer?**

**A: Although not recommended, there is no evidence to suggest longer sessions will hurt you.**

They will however likely be less effective.

- The top researchers in the industry have stated that it would take hours in a full body light device to begin to move to inhibition at the irradiance of the TheraLight.
- It is not practical or recommended to go beyond 20 minutes sessions allowed by the tablet.

**Q: Is there evidence?**

**A: Yes**

- PBM Therapy is used in thousands of clinics, hospitals and elite sports institutions in over 70 nations,.

- To review the published research, go to PubMed.gov and search by the terms Photobiomodulation, LLLT, or Low Level Light Therapy.
- Currently there are over 40 published research papers per month on the mechanisms of PBM therapy. The primary evidence is in musculoskeletal pain and dysfunction, however a wide variety of conditions are being studied as well.. These include but are not limited to
  - **Musculoskeletal Pain**
    - Arthritis
    - Back pain
    - Bursitis
    - Carpal Tunnel
    - Disc Degeneration
    - Headaches
    - Jaw pain
    - Joint pain
    - Muscle Spasm
    - Neck pain
    - Plantar Fasciitis
    - Sprains/Strains
    - Tendonitis/Tendinopathies
  - **Inflammatory Conditions**
    - Chronic Fatigue
    - Fibromyalgia
    - Psoriatic Arthritis
    - Rheumatoid Arthritis
  - **Skin Conditions**
    - Psoriasis
    - Rosacea
    - Dermatitis
    - Burn and Wound healing
    - Antiaging
    - Oral mucositis
    - Radiation dermatitis
  - **Sports Medicine**
    - Increasing Exercise Capacity
    - Extending Exercise Endurance
    - Accelerating Exercise recovery by reducing Lactic Acid, Creatinine Kinase, and C-Reactive protein
  - **Mental Health/Neuroregeneration**
    - Depression
    - PTSD
    - Anxiety
    - Neuropathic pain

- Alzheimers
- Parkinsons
- Spinal cord injury
- TBI

|                                     | # studies<br>1976-1999 | # studies<br>2000-2005 | # studies<br>2006-2010 | # studies<br>2011-2015 | # studies<br>2016-2020 | # studies<br>2021 | Total  |
|-------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------|--------|
| <b>Low Level Laser Therapy</b>      | 222                    | 882                    | 1,645                  | 2,356                  | 2,947                  | 208               | 8,260  |
| <b>LLLT</b>                         | 75                     | 785                    | 1,511                  | 2,090                  | 2,573                  | 150               | 7,184  |
| <b>Low Intensity Laser Therapy</b>  | 285                    | 178                    | 262                    | 341                    | 429                    | 33                | 1,528  |
| <b>High Intensity Laser Therapy</b> | 171                    | 115                    | 192                    | 250                    | 406                    | 33                | 1,167  |
| <b>Photobiomodulation/<br/>PBMT</b> | 2                      | 15                     | 58                     | 161                    | 1,529                  | 313               | 2,078  |
| <b># Papers / Month</b>             | 2.7                    | 32.9                   | 61.1                   | 86.6                   | 131.4                  | 737               | 20,217 |