TRANSCRANIAL-INTRANASAL PHOTOBiomODULATION DEVICE

THE VIELIGHT NEURO

The Vielight Neuro is a next generation transcranial-intranasal infrared neural stimulation device.

The Vielight Neuro’s powerful, wearable design combines the patented technology of intranasal light therapy with transcranial photobiomodulation for whole-brain stimulation targeting the brain’s Default Mode Network’s (DMN) hubs.

The DMN is of particular interest because it has been associated with Alzheimer’s disease, autism, schizophrenia, depression, chronic pain and other neurologic diseases. Since the discovery of the DMN, there have been many studies suggesting various nodes (or “hubs”) where there are high levels of activity and connectivity. So, the health of the whole network is closely dependent on the health of the hubs.

Energy Source Infrared LEDs
Wavelength 810 nm
Power Density 23 mW/cm²
Power Density per Transcranial LED 41 mW/cm²
Pulse Frequency 10 Hz
Effect Neurological

WEARABILITY, LIGHT ENERGY, THE FUTURE

For more information please visit www.vielight.com

Vielight devices have not been examined by the FDA or other regulatory agencies. They are low-risk general wellness products that do not require FDA clearance according to the FDA’s draft on “General Wellness: Policy on Low Risk Devices” - dated January 20, 2015.

All Vielight devices have been independently TÜV certified as safe for consumer use.

INTRANASAL PHOTOBiomODULATION DEVICES

THE VIELIGHT 633

The Vielight 633’s cold light (633 nm) targets the dense network of capillaries in the nasal cavity within a well-researched set of parameters.

Energy Source Optimized visible red
Wavelength 633 nm
Power Density 7.6 mW/cm²
Pulse Frequency Continuous
Effect Systemic

THE VIELIGHT 655

The Vielight 655’s low level laser light (655 nm) targets the dense network of capillaries in the nasal cavity within a well-researched set of parameters.

Energy Source Optimized low level laser
Wavelength 655 nm
Power Density 5 mW/cm²
Pulse Frequency Continuous
Effect Systemic

THE VIELIGHT 810

The Vielight 810’s near infrared (IR) light (810 nm) targets the underside of the brain. Engineered to pulse at 10 Hz, this frequency is associated with neural oscillation in the alpha state.

Energy Source Optimized LED
Wavelength 810 nm
Power Density 7.6 mW/cm²
Pulse Frequency 10 Hz
Effect Neurological

Why the nose?

Transcranial / intranasal light therapy devices
The nasal cavity is rich with blood capillaries - there are more capillaries per cm² than most organs of the body. Five arteries connect to the nasal cavity, while the Little's area is a frequent site of nasal bleeding.

Given the rich supply of blood and the thin, permeable membrane within the nasal cavity, this area is perfect for blood irradiation.

**POSITIVE EFFECTS OF BLOOD IRRADIATION**

- Anti-inflammatory effects that improve the immunologic activity of the blood.
- Disaggregation and improved structure of erythrocytes, resulting in an improved oxygen supply.
- Enhanced nitric oxide synthesis by cytochrome c oxidase through the photobiomodulation process.

**INTRANASAL LIGHT THERAPY**

Intranasal light therapy channels low level visible red to infrared light (633 - 810 nm) into the capillary-rich nasal cavity, efficiently irradiating blood circulating through the nasal channel. Vielight intranasal light therapy devices have been engineered with well-researched parameters to optimize and maximize the modulating effects of light on the cellular level. Designed for wearability, our patented solid state technology allows you to use your intranasal devices anywhere, anytime.

**PROXIMITY**

The nasal cavity's proximity to the brain enables infrared light (810 nm) to be focused primarily on the underside of the brain. The underside of the brain contains important structures such as the ventral prefrontal cortex, hippocampus and hypothalamus. The main idea behind our invention was derived from photobiological research showing that neurons react positively when energized by infrared light stimulation.

**DIFFUSION OF 810 NM (IR) LIGHT THROUGH THE SOFT TISSUE AND BONE**

Infrared (IR) light is able to diffuse efficiently through soft tissue, bone and brain matter.

**BRAIN BIOENERGETICS**

Photobiomodulation augments neural cytochrome c oxidase activity, which enhances neuronal capacity for metabolic energy production that may be used to support cognitive brain function.

This is expected to increase neuronal respiration and boost brain energy metabolic capacity, which would constitute an adaptation with major neuroprotective implications.

**WHY PHOTOBIOMODULATION?**

At the cellular level, visible red and near infrared light stimulates cells to generate more energy and undergo self-repair. Each cell has mitochondria, which perform the function of producing cellular energy called 'ATP'. This production process involves the respiratory chain. A mitochondrial enzyme called cytochrome oxidase accepts photonic energy when functioning below par.

This light energy is converted into ATP for use. In addition, the process creates mild oxidants (ROS) that leads to gene transcription and then to cellular repair and healing. The process also unclogs the chain that has been clogged by nitric oxide (NO).

The nitric oxide is then released back into the system. Nitric oxide is a molecule that our body produces to help its 50 trillion cells communicate with each other by transmitting signals throughout the entire body. Additionally, nitric oxide helps to dilate the blood vessels and improve blood circulation.

**PHOTOBIOMODULATION RESEARCH**

Currently, the science of photobiomodulation and its beneficial, modulatory effects are being researched by institutions such as Harvard University, Boston University, US Department of Veteran Affairs, Wellman Center for Photomedicine and Massachusetts General Hospital.

**BRAIN BIOENERGETICS**

**NEAR INFRARED LIGHT**

**ATP**

**NO**

**GENE TRANSCRIPTION**

**ROS**

**NF-kB**

**AP-1**

**MITOCHONDRIUM**

**DIFFUSION OF 810 NM (IR) LIGHT**

**INTRANASAL LIGHT THERAPY**

**THE EVOLUTION OF INTRAVENOUS LOW LEVEL LIGHT THERAPY**

Intranasal light therapy channels low level visible red to infrared light (633 - 810 nm) into the capillary-rich nasal cavity, efficiently irradiating blood circulating through the nasal channel. Vielight intranasal light therapy devices have been engineered with well-researched parameters to optimize and maximize the modulating effects of light on the cellular level. Designed for wearability, our patented solid state technology allows you to use your intranasal devices anywhere, anytime.

**REFERENCES**

4. “Role of Low-Level Laser Therapy in Neurorehabilitation”; Javad T. Hashmi(MD), Ying-Ying Huang(MD), James Carroll, Michael R. Hamblin(PhD)
5. “Biphasic Dose Response in Low Level Light Therapy”; Sulbha K. Sharma(PhD), Ying-Ying Huang(MD), James Carroll, Michael R. Hamblin(PhD)

**SATURATION**

The nasal cavity is rich with blood capillaries - there are more capillaries per cm² than most organs of the body. Five arteries connect to the nasal cavity, while the Little's area is a frequent site of nasal bleeding.

**SATURATED WITH BLOOD CAPILLARIES**

**PROXIMITY**

The nasal cavity's proximity to the brain enables infrared light (810 nm) to be focused primarily on the underside of the brain. The underside of the brain contains important structures such as the ventral prefrontal cortex, hippocampus and hypothalamus. The main idea behind our invention was derived from photobiological research showing that neurons react positively when energized by infrared light stimulation.

**DIFFUSION OF 810 NM (IR) LIGHT THROUGH THE SOFT TISSUE AND BONE**

Infrared (IR) light is able to diffuse efficiently through soft tissue, bone and brain matter.

**BRAIN BIOENERGETICS**

Photobiomodulation augments neural cytochrome c oxidase activity, which enhances neuronal capacity for metabolic energy production that may be used to support cognitive brain function.

This is expected to increase neuronal respiration and boost brain energy metabolic capacity, which would constitute an adaptation with major neuroprotective implications.

**WHY PHOTOBIOMODULATION?**

At the cellular level, visible red and near infrared light stimulates cells to generate more energy and undergo self-repair. Each cell has mitochondria, which perform the function of producing cellular energy called 'ATP'. This production process involves the respiratory chain. A mitochondrial enzyme called cytochrome oxidase accepts photonic energy when functioning below par.

This light energy is converted into ATP for use. In addition, the process creates mild oxidants (ROS) that leads to gene transcription and then to cellular repair and healing. The process also unclogs the chain that has been clogged by nitric oxide (NO).

The nitric oxide is then released back into the system. Nitric oxide is a molecule that our body produces to help its 50 trillion cells communicate with each other by transmitting signals throughout the entire body. Additionally, nitric oxide helps to dilate the blood vessels and improve blood circulation.

**PHOTOBIOMODULATION RESEARCH**

Currently, the science of photobiomodulation and its beneficial, modulatory effects are being researched by institutions such as Harvard University, Boston University, US Department of Veteran Affairs, Wellman Center for Photomedicine and Massachusetts General Hospital.

**REFERENCES**

4. “Role of Low-Level Laser Therapy in Neurorehabilitation”; Javad T. Hashmi(MD), Ying-Ying Huang(MD), James Carroll, Michael R. Hamblin(PhD)
5. “Biphasic Dose Response in Low Level Light Therapy”; Sulbha K. Sharma(PhD), Ying-Ying Huang(MD), James Carroll, Michael R. Hamblin(PhD)