

# INTRANASAL PHOTOBIO-MODULATION IMPROVES ALZHEIMER'S CONDITIONS IN CASE STUDIES

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## Introduction:

According to the Alzheimer's Association, more than 5 million Americans are living with Alzheimer's Disease, and it claims a new patient every 67 seconds. There is no long-term treatment, and the most recent drug trials have failed or have been abandoned.

Research shows that low level light therapy (LLLT) or photobiomodulation stimulates the repair of damaged and dysfunctional cells, including neurons. With these findings, we aimed to direct LLLT to the key locations in the brain that are identified with Alzheimer pathology. Based on this premise, the entorhinal cortex and the hippocampus are identified with early pathology and therefore, are viable targets for purposeful healing. They are located on the underside of the brain, an area most accessible for treatment from the nasal cavity. Based on this hypothesis, LLLT energy should be directed to the underside of the brain via the nasal cavity.

We followed a group of four Alzheimer and dementia patients to examine how well they respond to LLLT energy that was directed to the underside of their brains via the nasal cavity ("intranasal light therapy"). The parameters applied are known to reasonably penetrate human tissues with sufficient depth and stimulate neuron recovery.

## Materials & Methods:

Information about the Intranasal Light Therapy device:

Manufactured by Vielight Inc.

Light source: Light emitting diode (LED)

Wavelength: 810 nm

In pulse mode at 10 Hz

Maximum power: 13 mW/cm<sup>2</sup>

Duration: 25 minutes per treatment session

Treatment frequency: Daily

In the case of "Rudy", the protocol was supplemented with 633 nm LED continuous wave intranasal device with a power of 7.5 mW/cm<sup>2</sup>.

Test: For two cases (including "Rudy"), Mini Mental State Examination (MMSE) were performed before and after one year of intranasal light therapy treatments. In the other two cases, feedback was obtained from caregivers before and after one year of use.

## Objectives:

\*To observe the response of human Alzheimer patients to intranasal low level light therapy (photobiomodulation).

\*To provide a basis for a new Alzheimer treatment, pending further clinical studies, for validation and regulatory clearance.

## References:

1. Giuliani et al. Low infra red laser light irradiation on cultured neural cells: effects on mitochondria and cell viability after oxidative stress. BMC Com Alt Med 2009, 9:8.

2. Purushothuman S, Johnstone DM, Nandasena C, Mitrofanis J, Stone J (2014).

"Photobiomodulation with near infrared light mitigates Alzheimer's disease-related pathology in cerebral cortex –evidence from two transgenic mouse models". Alzheimer's Research & Therapy

6(2). (Conclusion: **Transcranial near infrared photobiomodulation reverses the formation of A $\beta$  plaques and neurofibrillary tangles; and improves cognition and memory in Alzheimer mice.**)

3.Chien, Y.W., K.S.E. Su, and S.F. Chang, Chapter 1: Anatomy and Physiology of the Nose. Nasal Systemic Drug Delivery, 1989. Dekker, New York: p. 1-26.(Conclusion: **Blood flow to the nasal cavity is higher than blood flow to the brain, liver or muscle.**)

### **Results:**

In the case study of “Rudy”, his MMSE scores improved from “significant cognitive impairment” to borderline “no cognitive impairment”. The other case study tested with MMSE improved from “significant cognitive impairment” to “mild cognitive impairment”.

Of the subjectively observed cases, the caregivers reported “significant” improved memory and cognition.”

The quality of outcomes appear to depend on the willingness of the patients to comply and the caregivers’ commitment to assist.

Based on the MMSE scores, observations and caregivers’ feedbacks, the best outcomes come from disciplined adherence to usage protocol.

No apparent side effects or contraindications were observed.

Large controlled studies are required for validation.

### **Conclusion:**

Intranasal photobiomodulation delivered with the appropriate parameters and protocol can potentially reverse Alzheimer’s disease.

However, large controlled studies designed to produce statistically significant evidence are still needed to confirm this potential.

### **Details of Case Study: Rudy, 84 Years Old:**

#### **He had Alzheimer symptoms before treatment regimen:**

- Forgot the names of family members
- Became confused in social settings when he used to be “the life of the party”
- Was disorientated in surroundings
- Lost his love and craftsmanship for woodworking
- Categorized as having “significant cognitive impairment” in MMSE score

#### **After one year of treatment with intranasal photobiomodulation:**

- Resumed normal and close relationship with the family
- Recovered his former social skills
- Resumed driving
- Restarted some woodworking.
- MMSE score upgraded to borderline “no cognitive impairment”

The subject has not recovered all of his cognitive ability but continues to regularly self-treat with intranasal photobiomodulation. He continues to improve.