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Safety and Efficacy of Biophoton Quantum Medicine in the Treatment of Neurodegenerative Diseases

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ABSTRACT

Neurodegenerative disorders such as Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis (ALS), and multiple sclerosis represent a significant and growing public health burden worldwide. Existing pharmacologic therapies primarily offer symptomatic relief and have limited efficacy in halting disease progression or reversing neuronal damage. Biophoton Quantum Medicine (BQM) is an emerging, non-invasive therapeutic approach that utilizes coherent biophoton emissions ultra-weak photon energy naturally produced by biological systems to modulate cellular and neurological function. This review explores the foundational principles of BQM, including its proposed mechanisms of action on mitochondrial bioenergetics, redox balance, neuroinflammation, and neural plasticity. Preclinical data in animal models demonstrate neuroprotective effects, while preliminary clinical observations suggest improvements in cognition, motor function, speech, sleep quality, and overall quality of life in patients with neurodegenerative conditions. BQM has shown a favorable safety profile, with no significant adverse events reported to date. Given its mechanistic plausibility and early clinical promise, BQM warrants further investigation through well-designed randomized controlled trials to establish its therapeutic value and integration into standard neurological care.

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Introduction

Neurodegenerative diseases affect millions worldwide, with increasing prevalence due to aging populations. These disorders are characterized by progressive neuronal loss, leading to cognitive, motor, and functional decline. Despite extensive research, current pharmacological interventions offer limited disease-modifying effects. The need for non-invasive, low-risk, and regenerative therapies has fueled interest in alternative modalities, including Biophoton Quantum Medicine (BQM). BQM leverages coherent biophotons to influence biological regulation at the quantum and cellular levels [1,2].

Scientific Basis of Biophoton Quantum Medicine

Biophotons are ultra-weak photon emissions from living organisms, first ranging from ultraviolet to near-infrared wavelengths that are naturally emitted by living cells. These emissions, typically measured at intensities of 10^{-16} to 10^{-1}, W/cm², were systematically studied by Fritz-Albert Popp [3]. These emissions exhibit coherence and appear to play roles in intracellular communication and regulation. Biophoton Quantum Medicine applies external coherent light fields to enhance biological order and energy transfer. Research suggests that biophotons modulate redox states, mitochondrial activity, and gene expression, aligning with principles of quantum biology who demonstrated that biophotons exhibit quantum coherence and are not merely byproducts of metabolism, but integral to cell signaling and regulation [3-5].

The coherent nature of biophotons allows them to function as informational carriers within the body, facilitating high-speed, long-range communication between cells. This coherence implies that the emitted light is highly ordered, akin to laser light, rather than chaotic like thermal radiation. This ordered emission is thought to maintain and synchronize biological functions at both intracellular and systemic levels.

Biophoton Quantum Medicine builds on this understanding by introducing structured, externally applied coherent light fields that can resonate with endogenous biophoton activity. These coherent fields may restore or reinforce cellular order that has been disrupted by disease or aging. Emerging evidence suggests that externally applied biophotons can entrain mitochondrial oscillations, stabilize redox homeostasis, and influence gene regulatory networks through mechanisms consistent with quantum biology and photonic resonance [4,5].

At the cellular level, biophoton interaction with chromophores and mitochondrial complexes can stimulate the electron transport chain, increase ATP synthesis and reduce oxidative damage. Additionally, biophoton-induced modifications in redox-sensitive transcription factors may promote expression of protective genes, anti-inflammatory cytokines, and neurotrophic factors, creating a more resilient cellular environment.

This framework integrates concepts from photobiomodulation, bioelectromagnetics, and quantum information theory, offering a holistic and physics-based approach to healing that is distinct from pharmacologic interventions. As a result, BQM provides a potential platform for bioresonance therapies aimed at restoring coherence and order to biological systems disrupt neurodegenerative diseases.

Mechanisms of Action Relevant to Neurodegenerative Disease
Biophoton Quantum
Medicine (BQM) exerts its therapeutic effects through multiple interrelated pathways that address key biological dysfunctions implicated in neurodegenerative disease progression:

1. **Mitochondrial Restoration:** Mitochondrial dysfunction is a hallmark of neurodegeneration, leading to reduced ATP output and increased production of reactive oxygen species (ROS). BQM has been shown to enhance mitochondrial membrane potential and stimulate the activity of respiratory chain complexes, particularly Complex I and IV. This results in improved ATP synthesis and a reduction in mitochondrial superoxide generation. By promoting more efficient oxidative phosphorylation, BQM supports neuronal energy demands and preserves cellular vitality in affected brain regions [6].
2. **Redox and Inflammation Control:** Chronic oxidative stress contributes to neuronal injury, protein aggregation, and inflammation in neurodegenerative conditions such as Alzheimer's and Parkinson's disease. BQM modulates cellular redox homeostasis by reducing lipid peroxidation, enhancing superoxide dismutase (SOD) and glutathione peroxidase (GPx) activity, and stabilizing intracellular NADPH levels. This antioxidant regulation is accompanied by a downregulation of pro-inflammatory cytokines such as TNF-α, IL-1β, and IL-6, along with upregulation of anti-inflammatory mediators like IL-10. These effects collectively mitigate neuroinflammation and help protect the neuronal microenvironment [7].
3. **Neurogenesis and Synaptic Support:** BQM has demonstrated the capacity to stimulate the release of brain-derived neurotrophic factors (BDNF), nerve growth factor (NGF), and other neurotrophic signals critical for synaptic maintenance and plasticity. Through enhancement of these pathways, BQM supports hippocampal neurogenesis, axonal sprouting, and synapse formation essential processes for cognitive recovery and learning. This action may counteract the synaptic loss and memory impairment commonly observed in neurodegenerative diseases [8].
4. **Immune Modulation:** Activated microglia and astrocytes contribute to sustained neuroinflammation and neurotoxicity. BQM appears to shift microglial phenotypes from pro-inflammatory M1 to anti-inflammatory M2 states and suppress overactivation of astrocytes, thereby reducing gliosis. It also modulates peripheral immune cell infiltration and balances cytokine profiles in cerebrospinal fluid (CSF), creating a more neuroprotective immunological landscape [9].
5. **Cell Survival:** Apoptosis and impaired autophagy are major contributors to neuronal loss in neurodegenerative disorders. BQM reduces caspase-3 activation and Bax/Bcl-2 ratio, signaling a decrease in programmed cell death. Concurrently, it enhances autophagic flux and lysosomal activity, facilitating clearance of misfolded proteins and damaged organelles. This dual action promotes cellular longevity and functional maintenance of neurons under stress conditions [10].

These mechanisms are not mutually exclusive; instead, they are likely to operate synergistically to promote neuroresilience. The systemic, non-pharmacologic nature of BQM enables simultaneous modulation of mitochondrial, redox, inflammatory, and regenerative pathways without introducing exogenous chemicals, making it a uniquely integrative approach for neurodegenerative disease intervention.

Preclinical Evidence
A growing body of preclinical studies supports the potential of Biophoton Quantum Medicine (BQM) in mitigating neurodegenerative pathology in animal models. These studies primarily focus on Alzheimer's disease (AD), Parkinson's disease (PD), and other age-related neurodegenerative processes.

In transgenic mouse models of AD (e.g., APP/PS1 mice), exposure to coherent light and biophoton-emitting devices has resulted in improved spatial learning and memory, as assessed by the Morris water maze and Y-maze tests. These improvements correlate with the reduced amyloid-beta plaque burden in the hippocampus and cortex, suggesting enhanced clearance or suppressed aggregation of pathological proteins. Similar benefits were observed in PD models (e.g., MPTP-induced mice), where BQM exposure led to preserved dopaminergic neurons in the substantia nigra, as well as enhanced motor coordination in rotarod and grip strength tests [11,12].

Mechanistic investigations have revealed several molecular and cellular changes underpinning these functional improvements. For instance, increased expression of mitochondrial complexes I and IV have been noted in treated animals, alongside elevated levels of ATP and reduced accumulation of mitochondrial ROS. Key mitochondrial enzymes such as citrate synthase and cytochrome c oxidase exhibited higher activity levels post-treatment, indicating enhanced mitochondrial biogenesis and oxidative phosphorylation efficiency.

Biophoton therapy has also normalized oxidative stress biomarkers, including reductions in malondialdehyde (MDA) and 4-hydroxynonenal (4-HNE) levels, along with restored glutathione and superoxide dismutase activity. Inflammation markers such as Iba1 (for microglia) and GFAP (for astrocytes) showed decreased expression, reflecting attenuated gliosis and reduced neuroinflammation. Additionally, increased levels of neurotrophic factors like BDNF and NGF were observed, contributing to synaptic repair and neurogenesis [13].

Histopathological analyses consistently demonstrate reduced neuronal loss, preserved hippocampal architecture, and lower levels of apoptosis (as evidenced by TUNEL staining) in biophoton-treated animals compared to controls. These findings strongly support the neuroprotective and restorative potential of BQM and provide a compelling rationale for translating these interventions into clinical trials.

Clinical Observations and Case Studies
Observational reports and pilot studies involving human subjects have provided encouraging preliminary evidence regarding the efficacy and safety of Biophoton Quantum Medicine (BQM) in the management of neurodegenerative diseases. These reports encompass both anecdotal case studies and structured open-label trials, focusing primarily on patients diagnosed with Alzheimer's disease (AD), Parkinson's disease (PD), and other age-related cognitive disorders [14,15].

Patients undergoing BQM typically experience treatment through exposure to biophoton-emitting medical devices for several hours per day over a multi-week period. In many cases, significant improvements are reported in domains such as memory recall, orientation, speech fluency, and executive function. For instance, Alzheimer's patients receiving biophoton therapy have demonstrated enhanced performance in cognitive screening tools such as Alzheimer's Questionnaire (AQ) and Montreal Cognitive Assessment (MoCA) after 4 to 8 weeks of therapy. The open-label feasibility study with 16 participants with clinically diagnosed

Alzheimer's disease demonstrated that 75% of study participants showed measurable cognitive improvement alongside enhanced quality of life (SF-36 score). Functional imaging, including EEG and non-linear quantum scan, revealed increased cerebral energy and improved neurological function following repeated biophoton exposure during overnight sleep [15].

In Parkinson's disease, case documentation indicates a reduction in tremor amplitude, increased stability during gait, and fewer freezing episodes. Patients also report decreased rigidity and improved handwriting dexterity. Notably, several users have been able to reduce their dosage of dopaminergic medications under medical supervision while maintaining functional improvement, suggesting a potential synergistic effect [16].

Case Observation: Biophoton Support in Amyotrophic Lateral Sclerosis (ALS). ALS remains a challenging neurodegenerative disease with limited effective treatment options. On January 5, 2022, an ALS patient identified as KH reported that the continuous use of four Tesla BioHealer®-Adult units over a period of four days, KH and his family reported multiple notable improvements. These included a return of healthy coloration to the face and extremities, increased hand and finger size resembling baseline measurements from two years prior, intermittent visibility of peripheral veins, and a sensation of warmth throughout the body. Additional functional improvements were observed, including restoration of tongue tone (previously noted as blunted), enhanced motor coordination while eating, increased energy, improved speech clarity (making verbal communication more intelligible), and significantly better sleep quality.

According to family members, the rapid improvements were unexpected and highly encouraging. KH maintained proximity to the four biophoton-generating units continuously (24 hours per day) during this observation period. Similar positive responses have been noted in other ALS patients following the use of Tesla BioHealing® products, suggesting a potential role for biophoton therapy in supporting systemic functions affected by ALS.

Case Observation: Biophoton Therapy in Epilepsy Management. Among four individuals with epilepsy who used biophoton-generating devices, one patient reported significant improvement following four weeks of continuous therapy. According to the patient, the frequency and intensity of seizures were markedly reduced, resulting in a substantial improvement in quality of life. The individual was able to resume daily activities that had previously been limited for years due to the severity of the condition. This observation suggests a potential role for biophoton therapy as a supportive modality in managing epilepsy, warranting further clinical investigation.

Emotional and psychological benefits have also been consistently observed. Caregivers and patients alike report reductions in agitation, anxiety, and depressive symptoms, leading to improved social interaction and quality of life. Sleep quality a common challenge in neurodegenerative conditions often improves, with patients noting longer uninterrupted sleep cycles and fewer nighttime awakenings.

While biophoton therapy is generally considered low-risk, certain precautions are recommended. Individuals with conditions such as photodermatoses, light-sensitive epilepsy, or those taking photosensitizing medications should seek medical guidance before initiating therapy. Moreover, the safety and efficacy of biophoton therapy in pregnant individuals and young pediatric populations have not been sufficiently studied and should be approached with caution until further data become available.

Safety Profile

Biophoton Quantum Medicine (BQM) is distinguished by its non-invasive, non-thermal, and drug-free approach, which positions it as an inherently low-risk intervention suitable for a wide range of populations, including the elderly and medically fragile individuals. Unlike pharmacological treatments that often carry systemic side effects or invasive neuromodulatory procedures that involve surgical risks, BQM operates through externally applied biophotonic fields and does not require ingestion, injection, or physical implantation.

The devices used in BQM are often classified under general wellness devices as outlined in the FDA's guidance for low-risk products. These classifications apply when devices promote a healthy lifestyle, support the body's natural functions, and pose minimal safety concerns. BQM devices fall under this category when claims are limited to wellness support rather than disease treatment, although additional regulatory approval would be required for formal therapeutic labeling [17].

To date, post-market surveillance in over 45,000 users and observational data from clinical use have not revealed any clinically reportable adverse events directly associated with BQM exposure [18]. Participants in pilot studies and users of biophoton-emitting devices have tolerated the therapy well, with no reports of treatment-related toxicities, allergic reactions, or physiological disturbances. Mild and transient sensations such as warmth, tingling, or mild fatigue have occasionally been reported, but these are generally interpreted as signs of metabolic activation and resolve spontaneously. The safety data from most clinical studies are summarized in Table 1.

Table 1: Safety Outcomes of Clinical Studies

Clinical Study Number	Medical Condition	Total Number of Participants	Adverse Events Reported
TBHI-BF-222	Parkinson's Disease	46	0
FIAM-CS-202	Chronic Stroke	73	0
FIAM-TBI-235	Traumatic Brain Injury	32	0
FIAM-PC-226	Post COVID Condition	22	0
FIAM-AD-255	Alzheimer's Disease	9	0
FIAM-LM-323	Lyme Disease	6	0
TBHI-ADH-229	Ad Hoc	6	0
FIAM-SC-255	Stem Cells	56	0
FIAM-PN-385	Severe Pain	68	0
Total		318	0

The safety of all clinical studies was consistently reported as 100%. The clinical observed safety outcome was agreeable to the real-world safety evidence - biophoton generators did not cause any adverse events.

In summary, the current body of evidence suggests that BQM is a safe and well-tolerated modality. Its minimal risk profile makes it a compelling candidate for integration into multimodal treatment frameworks, especially for neurodegenerative diseases where many conventional options carry a high burden of side effects.

Comparative Overview

Biophoton Quantum Medicine (BQM) stands out among energy-based therapeutic modalities due to its non-contact, non-invasive, and system-wide mode of delivery. When compared to other modalities such as transcranial photo biomodulation (tPBM), transcranial magnetic stimulation (TMS), low-level laser therapy (LLLT), and deep brain stimulation (DBS), BQM offers a unique combination of accessibility, safety, and systemic bioenergetic influence.

1. Transcranial photobiomodulation, for instance, typically involves targeted delivery of low-level red or near-infrared light to the skull using LED arrays or laser probes. While tPBM has shown promise in modulating cortical activity and improving cognitive function, it requires precise placement of hardware, limited penetration depth, and operator training. By contrast, BQM devices can deliver coherent light fields across broader anatomical regions or the whole body simultaneously without direct contact or localization challenges. This permits a wider range of physiological targets, including peripheral and central systems, without the need for precise anatomical mapping.
2. Transcranial magnetic stimulation (TMS) and deep brain stimulation (DBS) are more invasive or high-intensity interventions, requiring electrode placement or magnetic coil calibration, often conducted in specialized clinical environments. These therapies carry risks such as seizures, mood disturbances, or surgical complications. BQM, with its low-risk, home-based usability, eliminates these procedural risks and supports long-term, passive therapy sessions conducive to chronic care and elderly populations.

From a cost and logistics perspective, BQM offers significant advantages. The devices are relatively simple to operate, do not require technical installation or clinical supervision, and can be reused repeatedly without consumables. This reduces healthcare resource burden and improves adherence through convenience. Moreover, BQM can be administered in residential settings, elder care facilities, or outpatient clinics without disrupting daily routines, making it more scalable for community-based care.

Importantly, BQM is not mutually exclusive with pharmacologic or rehabilitative care. It may enhance the effectiveness of conventional therapies by improving tissue perfusion, reducing inflammation, and supporting mitochondrial health. This positions BQM as a valuable integrative tool rather than a competing treatment modality.

As scientific understanding grows, BQM's comparative advantages in systemic reach, safety, patient autonomy, and multimodal compatibility could make it a foundational element in future frameworks for neurodegenerative and chronic disease management.

Regulatory and Ethical Considerations

Biophoton Quantum Medicine (BQM) currently occupies a regulatory gray area in many jurisdictions, where its use is generally permitted under the category of general wellness devices. In the United States, the Food and Drug Administration (FDA) permits marketing of low-risk devices that promote a healthy lifestyle without making direct therapeutic claims, provided that the devices do not pose undue risks to users. Under this policy, many BQM devices are legally marketed to support relaxation, improve energy, or promote sleep without requiring premarket approval [19].

However, once manufacturers or clinicians begin to assert claims related to the treatment, diagnosis, mitigation, or prevention of specific diseases such as Alzheimer's or Parkinson's these devices fall under the definition of a medical device and are subject to stricter regulatory scrutiny. In such cases, manufacturers must pursue a formal regulatory pathway such as the De Novo classification or 510(k) clearance process, supported by safety and efficacy data from clinical studies. The De Novo pathway, in particular, is appropriate for novel low- to moderate-risk devices for which no predicate exists and may offer a feasible route for BQM to be recognized as a legitimate therapeutic tool in neurology.

Internationally, similar frameworks exist. For instance, in the European Union, BQM devices would need to comply with the Medical Device Regulation (MDR) if therapeutic claims are made, including conformity assessment and CE certification. In countries such as Canada, Japan, and Australia, analogous health agencies require clinical evidence for therapeutic marketing claims.

From an ethical standpoint, the growing interest in BQM necessitates clear communication, practitioner accountability, and patient protection. Vulnerable populations such as those with cognitive impairments, elderly individuals, or those seeking alternative treatments for chronic, untreatable conditions must be safeguarded from overpromised or misleading claims. Ethical deployment of BQM includes:

- Informed consent, especially in cases involving off-label or investigational use.
- Practitioner training, ensuring that those administering or recommending BQM understand both the scientific rationale and the boundaries of evidence-based practice.
- Data transparency, including the publication of both positive and null findings to prevent selective reporting.
- Marketing integrity, avoiding pseudoscientific language or exaggerated representations of efficacy.

Furthermore, oversight bodies may consider establishing ethical review boards or independent safety monitoring panels for long-term BQM use in vulnerable populations.

As the field matures, ethical guidelines and regulatory frameworks will need to evolve in tandem to support both innovation and patient safety. Responsible development and deployment of BQM requires continued collaboration among researchers, clinicians, industry stakeholders, and regulators to ensure that therapeutic benefits are grounded in science and delivered with integrity.

Future Directions

The future of Biophoton Quantum Medicine (BQM) lies in advancing it from promising observational therapy to a rigorously validated biomedical intervention. To achieve this, well-designed, large-scale clinical trials are urgently needed to establish efficacy, dosage parameters, long-term safety, and disease-specific protocols. These studies should ideally be randomized, double-blinded, and placebo-controlled to eliminate bias and confirm causality [20].

1. Standardization of treatment parameters including exposure duration, biophoton intensity, coherence length, frequency, and treatment intervals is a critical first step. Without uniform protocols, comparing outcomes across studies and replicating results becomes difficult. Future trials should also stratify participants by disease stage, age, comorbidities, and prior treatment history to identify differential responders and personalize therapy.
2. Quantitative and objective outcome measures must be prioritized. These may include validated clinical scales (e.g., MMSE, UPDRS), patient-reported quality of life assessments, and neuropsychological batteries. However, to fully understand the physiological underpinnings and therapeutic mechanisms of BQM, incorporation of multimodal neuroimaging and biomarker analyses is essential. Techniques such as:
   - EEG (to measure brainwave modulation and cortical connectivity),
   - MRI/fMRI (to assess structural and functional changes, including hippocampal volume and blood oxygenation levels),
   - PET (to track neuroinflammation, glucose metabolism, and receptor binding), and
   - Near-infrared spectroscopy (fNIRS) (to detect cortical blood flow changes) can provide insight into the neurobiological effects of biophoton exposure.

Biomarkers such as BDNF, inflammatory cytokines, mitochondrial metabolites, and oxidative stress markers can help correlate clinical outcomes with molecular changes, enhancing the credibility of mechanistic claims.

Interdisciplinary collaboration will be essential to accelerate progress. Physicists can refine biophoton measurement and delivery systems; neuroscientists can explore neuroplasticity and neural network effects; clinicians can design patient-centered trials; and bioengineers can create wearable or embedded BQM platforms.

Moreover, longitudinal studies examining disease progression, treatment adherence, and cognitive trajectories over time can offer insights into BQM's disease-modifying potential, not just symptomatic relief. These studies included those who had unmet medical condition [15, 21-25]. However, a large populations study is needed to ensure generalizability across ethnic, age, and socioeconomic groups.

Lastly, regulatory and commercial readiness must evolve in parallel. As efficacy and safety evidence grows, BQM devices may seek formal approval through FDA De Novo classification or international equivalents. Data from real-world evidence programs, registries, and digital health integrations can support post-market surveillance and personalized therapy algorithms.

In summary, the future of BQM will be shaped by rigorous science, transparent communication, and commitment to multidisciplinary innovation. If these goals are met, BQM could emerge as a foundational modality in next generation neuromedicine.

Conclusion

Biophoton Quantum Medicine (BQM) represents an emerging frontier in the treatment of neurodegenerative diseases, offering a novel paradigm that diverges from traditional pharmacological and invasive interventions. Its foundation in quantum biology and coherent light interactions provides a mechanistically plausible framework to address key pathological features of neurodegeneration, namely mitochondrial dysfunction, oxidative stress, neuroinflammation, impaired neurogenesis, and apoptotic cell loss.

The therapeutic promise of BQM lies in its ability to promote self-regulation and systemic coherence in biological systems through non-contact, non-toxic, and patient-friendly modalities. Early observational studies, pilot clinical experiences, and encouraging preclinical data point to its capacity to restore function, improve quality of life, and potentially slow or reverse aspects of disease progression. These outcomes have been observed not only at the symptomatic levels such as improvements in memory, sleep, and motor function but also at the cellular and molecular levels, including enhancements in ATP production, antioxidant capacity, and neurotrophic signaling.

Importantly, BQM aligns with the growing emphasis in modern medicine on personalization, safety, and integrative care. It can be easily combined with existing pharmacologic therapies, physical rehabilitation, and cognitive training, providing a supportive platform without the risk of drug interactions or surgical complications. Its accessibility and suitability for in-home or outpatient use further enhance its value in managing chronic and progressive diseases.

Despite these encouraging developments, BQM remains at a critical juncture. Its widespread clinical adoption depends on rigorous scientific validation through controlled trials, peer-reviewed research, and standardized treatment frameworks. Ethical deployment, regulatory clarity, and professional education will be key to ensuring safe, effective, and equitable implementation.

In summary, BQM holds significant potential to complement and in some cases, transform the current landscape of neurotherapeutic strategies. If its early results are substantiated through continued research, BQM could evolve into a cornerstone of next-generation medicine, offering new hope to millions affected by neurodegenerative disorders.

References

1. Selvaraj V (2020) Neurodegenerative disease mechanisms and therapeutic targets. J Neurol Res Rev Rep 8: 45-53.
2. Zhang Y (2022) The rising role of energy-based therapies in neurology. J Neurol Res Rev Rep 10: 12-21.
3. Popp FA, Chang JJ (1998) Mechanism of interaction between electromagnetic fields and living systems. Springer 43: 507-518.
4. Wang L (2021) Biophoton emissions and mitochondrial regulation: emerging evidence of quantum biological communication. J Neurol Res Rev Rep 9: 33-41.
5. Sharma S (2019) Photobiomodulation therapy promotes SIRT1 expression and improves mitochondrial function. J Neurol Res Rev Rep 7: 28-36.
6. Cheng G (2023) Quantum coherence in biological systems. J Neurol Res Rev Rep 11: 1-10.
7. Smith R (2020) Biophoton interaction with redox balance. J Neurol Res Rev Rep 8: 16-24.
8. Alvarez B (2023) Synaptic repair and quantum light modulation. J Neurol Res Rev Rep 11: 22-29.
9. Gomez J (2022) Microglia and photonic regulation. J Neurol Res Rev Rep 10: 51-58.
10. Zhao X (2020) Autophagy and cell survival under biophoton influence. J Neurol Res Rev Rep 8: 60-67.
11. Lee D (2021) Animal studies on biophoton efficacy. J Neurol Res Rev Rep 9: 14-20.

12. Patel K (2022) Motor improvement via photonic therapy. J Neurol Res Rev Rep 10: 19-27.
13. Ramos L (2021) Biochemical changes post biophoton exposure. J Neurol Res Rev Rep 9: 30-39.
14. Kim H (2022) Clinical cases of cognitive improvement. J Neurol Res Rev Rep 10: 42-49.
15. Liu J (2024) Alzheimer's Disease Was Successfully Treated with Biophoton Generators. The Alzheimer's Association International Conference (AAIC), July 27-Aug 2, 2024, Philadelphia 39.
16. Tartak D (2025) Biophoton Quantum Therapy to Treat Advanced Glaucoma: A Novel Non-Invasive Approach for Ocular Neuroprotection. Photonics 25.
17. FDA (2016) General wellness policy for low-risk devices. Available from: https://www.fda.gov.
18. Center Watch (2025) The Impact of Biophoton Therapy on Self-Grown Stem Cells https://www.centerwatch.com/clinical-trials/listings/NCT06855459/the-impact-of-biophoton-therapy-on-self-grown-stem-cells.
19. Carter T (2021) Regulatory trends in photonic medicine. J Neurol Res Rev Rep 9: 18-25.
20. Thompson B (2023) Future outlook for energy-based neuromodulation. J Neurol Res Rev Rep 11: 30-38.
21. Hu Y (2025) Reversal of Tissue Glycation and Cholesterol Accumulation by Strong Biophotons: A New Anti-Aging Mechanism. Gerontol & Geriatric Stud 9. 807-813.
22. Liu JZ (2025) Biophoton Therapy Successfully Treated Multiple Gene Mutations Associated with a Rare Muscular Degenerative Condition: Case Report. Biomedical J Sci Tech Res 86.
23. Smotrys MA (2023) Energetic homeostasis achieved through biophoton energy and accompanying medication treatment resulted in sustained levels of Thyroiditis-Hashimoto's, iron, vitamin D & vitamin B12. Metabolism Open 18: 100248.
24. O'Neill R (2020) Comparison of non-invasive light therapies. J Neurol Res Rev Rep 8: 8-15.
25. Liu JZ, Mariola Smotrys, Seth D Robinson, Sherry Liu, Helen Y Gu (2025) Therapeutic Benefits of Biophoton Therapy in Parkinson's Disease: Clinical Evidence from a Pilot and Real-World Study. Journal of Neurology Research Reviews Reports 7: 1-6.