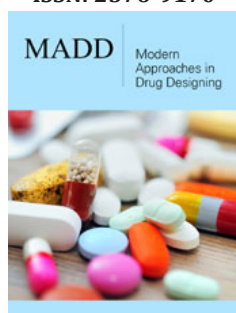


Harnessing Biophoton Energy: A Novel Paradigm to Treat Unmet Medical Conditions

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Abstract

Despite remarkable progress in drug development, a wide range of chronic, degenerative, and treatment-resistant conditions remain poorly managed by conventional therapies. Biophoton therapy, a non-invasive, energy-based modality leveraging coherent light emissions from biological systems, offers a promising complementary strategy. This review explores the emerging role of biophotons in cellular communication, mitochondrial repair, immune regulation, and systemic healing. We present experimental findings and clinical observations suggesting the effectiveness of biophoton-emitting devices in addressing unmet medical needs such as neurodegeneration, diabetes, chronic pain, and circulatory dysfunction. We further outline proposed mechanisms of action, compare this modality with photobiomodulation and quantum biology, and provide perspectives on its integration into modern drug design and personalized medicine.

Keywords: Biophoton therapy; Mitochondrial bioenergetics; Reactive oxygen species; Quantum biology; Chronic disease management; Non-Invasive regenerative medicine

Introduction

The limitations of existing pharmacologic interventions for chronic diseases, particularly those rooted in mitochondrial dysfunction, systemic inflammation, or cellular degeneration, highlight an urgent need for innovative, non-toxic, and regenerative approaches. Biophoton therapy is an emerging modality grounded in quantum biology, leveraging Ultra-Weak Photon Emissions (UPEs) produced endogenously by cells. These biophotons, coherent and information-rich, are increasingly understood to play regulatory roles in intercellular communication and metabolic balance. Originally observed by Fritz-Albert Popp, biophotons were proposed to coordinate biological order, particularly through DNA resonance and oxidative processes. Recent technological advancements have enabled the external generation and concentration of therapeutic level biophotons, leading to new applications in medicine [1-2]. These biophoton generators emit coherent light fields that appear to interact with biological systems, enhancing self-regulation and tissue repair mechanisms. This review synthesizes current knowledge on biophoton science and highlights its application across diverse medical conditions for which pharmaceutical approaches have shown limited success.

Biophysical Basis and Mechanisms of Action

Biophotons are ultra-weak electromagnetic emissions (200-1200nm) from living cells, often originating from mitochondrial redox activity and oxidative metabolic reactions. These emissions have been shown to:

A. Synchronize cellular oscillations and enhance coherence [3]. Biophotons are not merely byproducts of metabolic activity, they appear to play an active role in organizing and synchronizing biological processes at the cellular and multicellular levels. Research by Popp and colleagues demonstrated that Ultra-Weak Photon Emissions (UPEs) from cells exhibit temporal and spectral coherence, like laser light, enabling them to function as signaling agents in biological regulation [3]. This coherence allows biophotons to serve as carriers of information, coordinating oscillatory behaviours such as calcium ion fluxes, circadian rhythms, enzymatic activities, and gene expression across cells and tissues.

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When a coherent external biophoton field is applied to the body, it can entrain disordered cellular oscillations back into synchrony, effectively re-establishing a higher degree of systemic coherence. This phenomenon, termed biological coherence coupling, has been associated with enhanced intercellular communication, reduced entropy, and the restoration of functional homeostasis. In degenerative or chronically inflamed tissues where such oscillatory synchrony is disrupted, biophoton therapy may act as an external “resonant tuning fork,” re-aligning cellular communication networks and contributing to regenerative healing responses.

B. Modulate DNA transcription and repair [4]. Biophotons have been implicated in the regulation of genetic activity through their interaction with nuclear structures, particularly DNA. Experimental and theoretical work by Van Wijk and others suggests that DNA functions not only as a carrier of genetic information, but also as a light-absorbing and light-emitting molecule capable of engaging in electromagnetic signaling. The helical structure of DNA allows it to act as an antenna for coherent electromagnetic fields, absorbing specific frequencies and emitting ultra-weak photons in response [4]. This biophotonic activity is believed to facilitate intranuclear and intercellular communication and may modulate the dynamics of gene expression and repair mechanisms.

Specifically, coherent light interactions have been shown to influence chromatin remodeling, histone modifications, and the recruitment of transcription factors—processes that underlie the activation or repression of genes. In addition, biophoton fields may accelerate the recognition and resolution of DNA damage by enhancing the efficiency of repair enzymes such as DNA polymerase, ligase, and endonucleases. This is particularly relevant in pathologies characterized by genomic instability, such as cancer, neurodegeneration, or radiation exposure, where the restoration of DNA repair capacity is crucial. Moreover, since oxidative stress is a major contributor to DNA damage, and biophoton therapy has been shown to reduce intracellular Reactive Oxygen Species (ROS), this modality may provide both direct and indirect genomic protection. Altogether, these findings support the view that biophoton exposure can help normalize gene regulatory networks and promote cellular rejuvenation through quantum-level modulation of DNA activity.

C. Improve mitochondrial ATP production via photonic stimulation of cytochrome c oxidase [5]. One of the most well-studied and biologically significant mechanisms of photonic therapy involves the stimulation of mitochondrial respiration through the action of light on Cytochrome c Oxidase (CcO)-Complex IV of the electron transport chain. This enzyme plays a critical role in cellular energy metabolism, catalyzing the final step of electron transfer from cytochrome c to molecular oxygen, thereby contributing to the proton gradient used for ATP synthesis. Research in photobiomodulation has shown that photons in the red to near-infrared range (600-900nm) can be absorbed by CcO, leading to increased electron transfer, enhanced mitochondrial membrane potential, and elevated production of ATP [5].

Biophoton therapy builds upon this foundational insight by delivering coherent, non-ionizing light at biologically resonant

wavelengths that closely match the natural absorption spectrum of CcO. This photonic interaction displaces inhibitory molecules such as Nitric Oxide (NO) from the active site of CcO, unblocking the enzyme and restoring efficient electron flow through the respiratory chain. The result is a measurable increase in oxidative phosphorylation, which translates into higher cellular energy availability and improved metabolic function.

This mechanism has profound implications for treating energy-deficient conditions, including neurodegenerative diseases, chronic fatigue, ischemia-reperfusion injuries, and diabetes. Furthermore, enhanced mitochondrial performance supports critical downstream processes such as calcium buffering, redox balance, and apoptosis regulation—making photonic stimulation of CcO a central node in systemic regeneration. Importantly, biophoton generators deliver this stimulation non-invasively and systemically, allowing for safe, repeatable, and scalable interventions across a wide range of clinical conditions where mitochondrial dysfunction is a root cause.

D. Reduce Reactive Oxygen Species (ROS) through bioresonance stabilization [6]. Oxidative stress—characterized by excessive production of Reactive Oxygen Species (ROS) that overwhelm the body’s antioxidant defenses—is a major contributor to cellular aging, DNA damage, inflammation, and chronic disease progression. While ROS are naturally produced during mitochondrial respiration and immune defense, chronic elevation leads to lipid peroxidation, protein misfolding, and mitochondrial dysfunction. Biophoton therapy has shown promising potential to reduce ROS levels through a mechanism known as bioresonance stabilization. This concept is rooted in quantum biology and electromagnetic field theory, wherein coherent light frequencies interact with biological molecules to restore their optimal vibrational states. Studies suggest that when cells are exposed to coherent biophoton fields, molecular structures—including proteins, membranes, and enzymes—undergo resonance entrainment, resulting in increased structural stability and reduced chaotic energy exchange that can lead to ROS overproduction [6].

At the mitochondrial level, this stabilization effect improves the efficiency of the electron transport chain, reducing electron leakage that typically contributes to the formation of superoxide radicals. Furthermore, biophoton exposure appears to upregulate the activity of endogenous antioxidant enzymes such as Superoxide Dismutase (SOD), catalase, and glutathione peroxidase. These enzymes play key roles in neutralizing hydrogen peroxide and other free radicals, thereby protecting cells from oxidative injury. The bioresonance-induced reduction in ROS not only prevents damage to DNA, lipids, and proteins, but also supports cellular regeneration, immune modulation, and disease resolution. This antioxidant-like effect, delivered through non-pharmacological means, positions biophoton therapy as a valuable adjunct in treating diseases associated with oxidative stress—including neurodegenerative disorders, cardiovascular conditions, diabetes, autoimmune diseases, and cancer.

Externally applied biophoton generators amplify these effects by emitting a concentrated field of coherent biophotons, believed

to penetrate tissues and entrain endogenous light-based signaling networks. These devices operate without drugs or chemicals and thus offer potential for integration into a systems biology approach to healing, especially where pharmacological options are exhausted or cause toxicity.

Clinical Applications in Unmet Conditions

A. Neurodegenerative disorders

Conditions such as Alzheimer's, Parkinson's, and ALS involve progressive neuronal death, mitochondrial failure, and oxidative stress. Preliminary clinical observations suggest that biophoton exposure enhances neural energy metabolism, promotes microcirculation, and improves cognitive and motor functions. Biophoton therapy may activate neural stem cell niches and modulate neuroinflammatory markers, offering a non-invasive avenue to support brain regeneration [7-9].

B. Diabetes and metabolic dysfunction

Type 2 diabetes remains a leading global health burden, often poorly controlled by medications alone. Studies indicate that biophoton exposure can improve glucose metabolism by restoring mitochondrial bioenergetics and reducing insulin resistance. Case reports reveal stabilized blood glucose levels, reduced medication dependence, and improved microvascular flow following daily biophoton therapy [10].

C. Cardiovascular and circulatory impairments

Peripheral arterial disease, chronic wounds, and hypertension have been addressed with biophoton therapy by improving vasodilation, reducing blood viscosity, and enhancing endothelial repair. Live blood microscopy reveals improved erythrocyte morphology, plasma clarity, and microcirculatory dynamics post-treatment [9,10].

D. Chronic pain and inflammation

Patients with arthritis, fibromyalgia, and post-surgical pain report reductions in pain intensity and frequency after consistent biophoton exposure. These effects may be attributed to modulation of inflammatory cytokines and normalization of local tissue metabolism, suggesting analgesic potential without the side effects of opioids or NSAIDs [9,11].

E. Oncology (Supportive care)

While not a replacement for primary cancer therapy, biophoton therapy may aid in reducing chemotherapy side effects, supporting immunity, and restoring energy levels. Evidence is emerging for its role in modulating tumor microenvironments, though clinical trials are still required [12-14].

Why Biophoton Quantum Medicine is Very Safe and Broadly Effective to Treat Many Unmet Diseases

Biophoton Quantum Medicine (BQM) represents a fundamentally new paradigm in healthcare—one that is non-

invasive, non-pharmacological, and based on the natural light emissions of living systems. The exceptional safety and broad efficacy of BQM stems from its alignment with the body's intrinsic regulatory mechanisms. Unlike conventional drugs, which often interfere with molecular pathways and carry the risk of adverse reactions, BQM utilizes coherent, low-intensity biophoton emissions to support self-regulation, mitochondrial function, and systemic healing without introducing foreign substances [7-14]. Safety is one of the most defining attributes of BQM. Clinical use across a wide demographic spectrum—including elderly patients, children, and individuals with complex comorbidities—has shown no evidence of toxicity, allergic response, or pharmacological interactions. Because biophotons are naturally produced within the body as part of cellular communication and metabolic regulation, externally applied biophoton fields are biologically familiar and well-tolerated. This intrinsic biocompatibility minimizes the risk of overstimulation or disruption of healthy tissue, making the therapy ideal for repeated and long-term use [1-4].

The broad effectiveness of BQM arises from its foundational action on the most universal components of life: cellular energy metabolism, oxidative balance, DNA integrity, and intercellular communication. These core processes are implicated in virtually every chronic and degenerative disease—from neurodegenerative and cardiovascular conditions to metabolic disorders and autoimmune syndromes. By restoring mitochondrial ATP production, reducing reactive oxygen species, enhancing cellular coherence, and improving tissue perfusion, biophoton therapy addresses root dysfunctions that underlie many otherwise untreatable or drug-resistant conditions [7-14].

Furthermore, BQM works holistically, activating multiple repair systems simultaneously. This is in contrast to "single-target" drug interventions that may only suppress symptoms or address one pathway. BQM promotes systems-level balance, making it especially valuable for complex diseases involving multisystem dysfunction or unclear etiology. In summary, the non-toxic nature, biological resonance, and multi-targeted regulatory effects of Biophoton Quantum Medicine explain both its high safety profile and its ability to improve a wide range of conditions that remain unmet by current pharmacologic approaches. As the field of medicine continues to shift toward precision, integrative, and energy-based modalities, BQM offers a scientifically grounded and clinically transformative path forward.

Comparison with Existing Modalities

Biophoton therapy differs from traditional Photo Biomodulation (PBM) in its coherence, delivery spectrum, and non-laser application. Whereas PBM uses narrow-band LED or laser light in controlled doses, biophoton therapy employs naturally coherent fields like endogenous cell emissions. Moreover, it does not rely on external chromophores or photosensitizers, reducing phototoxicity risks. Unlike pharmaceuticals, there are no known pharmacokinetic interactions, making it a promising adjunct for polypharmacy-limited populations.

Integration into Modern Drug Design

The rise of systems pharmacology and quantum-informed therapeutics opens the door for biophoton-based interventions to complement molecular drugs. Biophoton devices could be embedded into patient care plans as biofield modulators or metabolic synchronizers, particularly in precision medicine frameworks. Furthermore, biophoton exposure may enhance the bioavailability or efficacy of certain compounds by improving tissue perfusion and mitochondrial uptake-an area worth exploring in drug development.

Conclusion

Biophoton therapy represents a compelling, non-invasive, and safe frontier in the treatment of complex, chronic, and unmet medical conditions. Its ability to restore biological coherence and energy regulation opens new possibilities for disease reversal and health optimization. While early evidence is promising, larger controlled clinical trials and mechanistic studies are essential to fully integrate this technology into mainstream drug design and healthcare systems. As modern medicine moves toward personalization and non-toxic interventions, biophoton-based approaches stand as a potential cornerstone of the next therapeutic revolution.

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