

**Innovations in Energy-Based Wellness:
Exploring the Science, Patents, and Research Behind the BioCharger**

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Abstract

The "Innovations in Energy-Based Wellness" Compendium serves as an in-depth guide designed for researchers, clinicians, wellness practitioners, and those deeply interested in energy-based wellness technologies. This comprehensive document delves into the scientific principles and patented innovations behind the BioCharger NG, a cutting-edge health optimization platform. The BioCharger NG uniquely integrates four distinct natural energies: Pulsed Electromagnetic Fields (PEMF), Pulsed Electric Fields (Voltage), Light Therapy, and Frequencies and Harmonics. Supported by decades of research in bioenergetics, electromedicine, and photobiology, this guide provides a brief understanding of how these energies work synergistically to support health and wellness. The compendium summarizes key scientific studies that demonstrate the applications of energy in health and wellness, while also highlighting the efficacy and safety of the technologies utilized in the BioCharger NG and the legal protections afforded by its extensive patent portfolio.

Innovations in Energy-Based Wellness

The purpose of this guide is to offer a comprehensive exploration of the scientific principles and patented technologies underlying energy-based wellness modalities, including those found in technologies like the BioCharger NG. This guide is intended for researchers, clinicians, wellness practitioners, and anyone with a deep interest in the science behind energy-based health optimization. This guide examines the foundational science, patented innovations, and empirical studies that explore health and wellness through the use of natural energy fields.

Energy-based wellness technologies harness natural energy fields—such as Pulsed Electromagnetic Fields (PEMF), Pulsed Electric Fields (Voltage), Light Therapy, and Frequencies and Harmonics—to support cellular health, optimize bodily functions, and promote recovery. These modalities are informed by decades of research in bioenergetics, electromedicine, and photobiology, offering insights into their potential to influence health and wellness.

Technologies like the BioCharger NG represent cutting-edge advancements in this space, integrating multiple energy fields to promote overall well-being. As a touchless, non-invasive platform, it serves as an example of how combining natural energies can support cellular communication, promote circulation, and encourage the body's natural energy and recovery processes. [18] Protected by a robust portfolio of patents, these technologies embody the intersection of science, innovation, and wellness.

This guide aims to illuminate the mechanisms through which these natural energy fields work synergistically, offering a detailed examination of the research, applications, and potential benefits of energy-based wellness technologies. By bridging the gap between

scientific exploration and practical application, this resource provides a foundation for understanding how energy fields can support health and optimize overall well-being.

Scientific Foundations

The BioCharger NG integrates four distinct energy types, each of which plays a crucial role in maintaining and enhancing human health. These energies are:

Pulsed Electromagnetic Fields (PEMF):

PEMF therapy uses low-frequency electromagnetic fields to stimulate and energize cells. These fields help to improve cellular function by enhancing the cell membrane's ability to allow nutrients and oxygen in while expelling waste products. Research has demonstrated that PEMF may play a role in supporting cellular function, enhancing tissue repair, reducing inflammation, and contributing to the body's natural recovery processes. [1]

Pulsed Electric Fields (Voltage):

Pulsed Electric Field therapy utilizes short bursts of high-voltage electric fields to stimulate and energize cells. These electric pulses enhance cellular function by increasing the permeability of the cell membrane, allowing for more efficient uptake of nutrients and oxygen, while also facilitating the removal of waste products. Studies have indicated that voltage may contribute to cellular health, support the reduction of inflammation, and enhance the body's natural recovery mechanisms. [6]

Light Therapy (Photobiomodulation):

Light therapy involves the use of specific wavelengths of light, including visible and infrared light, to stimulate biological processes within the body. Light therapy targets the mitochondria within cells, enhancing their ability to produce ATP (adenosine triphosphate),

the energy currency of the cell. This process has been shown to aid in tissue repair, mitigate inflammation, and contribute to overall well-being. [11]

Frequencies and Harmonics:

Frequency therapy utilizes specific frequencies that correspond to various bodily functions, helping to restore balance and harmony. It has shown potential in supporting the management of stress, pain, and neurological conditions. Harmonics, which are multiples of a fundamental frequency, enhance the BioCharger's therapeutic effects by creating resonant effects that improve cellular communication and physiological function, promoting overall health and balance. [15]

Energy Types in Focus

Pulsed Electromagnetic Fields (PEMF):

Pulsed Electromagnetic Fields (PEMF) therapy involves the use of low-frequency electromagnetic waves to stimulate and enhance cellular function. PEMF works by creating electromagnetic fields that interact with the body's cells, helping to improve ion exchange, enhance cell membrane potential, and promote better overall cellular health. These fields are similar to the natural electromagnetic fields found in the Earth, which are essential for maintaining optimal physiological function. PEMF research has shown a wide range of health benefits, including:

- **Enhanced Circulation:** PEMF improves blood flow by dilating blood vessels, ensuring that oxygen and nutrients are efficiently delivered to tissues. [2]
- **Accelerated Healing:** By promoting cellular repair and regeneration, PEMF therapy can speed up the healing process for injuries and post-surgical recovery. [3]

- **Pain Relief:** The electromagnetic fields generated by PEMF can reduce inflammation and alleviate pain, making it a valuable tool for managing chronic pain conditions. [4]
- **Improved Cellular Function:** PEMF enhances the cell's ability to absorb nutrients and expel waste, leading to better overall cellular health and vitality. [5]

Pulsed Electric Fields (Voltage):

Voltage therapy, also known as Pulsed Electric Fields (Voltage), involves the application of brief pulses of electric fields to biological tissues. Delivering controlled voltage pulses that penetrate the body's tissues influencing cellular activity at a fundamental level. These electric fields mimic the natural electrical signals in the body, which are crucial for cellular communication, function, and regeneration. Voltage therapy works by delivering electrical energy to the cells, which can influence a variety of cellular processes, including:

- **Cell Membrane Permeability:** The application of pulsed electric fields temporarily alters the permeability of cell membranes, facilitating the movement of ions and molecules into and out of cells. This can enhance nutrient uptake, waste removal, and overall cellular efficiency. [7]
- **Stimulation of Cellular Repair:** Voltage therapy can stimulate cellular repair mechanisms by activating voltage-gated ion channels, which play a critical role in cell signalling and homeostasis. This is particularly beneficial for damaged or aged tissues, as it can promote faster recovery and regeneration. [8]
- **Modulation of Inflammation:** The controlled application of electric fields has been shown to modulate inflammatory responses at the cellular level. By influencing the

behavior of immune cells and reducing pro-inflammatory signals, voltage therapy can help manage chronic inflammation and associated conditions. [9]

- **Tumor Ablation:** PEF therapy has been effectively applied in cancer therapy to introduce therapeutic agents into tumor cells, stimulate immune responses, and induce targeted cell death, including necrosis and immunogenic cell death, showcasing its potential to eliminate tumors and reduce metastasis. [10]

Light Therapy (Photobiomodulation):

Light Therapy, also known as Photobiomodulation, involves the use of specific wavelengths of light, including visible and infrared light, to stimulate biological processes within the body. When utilizing a combination of red, near-infrared, and visible light, wavelengths penetrate the skin and reach the mitochondria, the energy powerhouses of cells. This process stimulates the production of ATP (adenosine triphosphate), which is essential for cellular energy and function. Photobiomodulation works by delivering light energy to the cells, which is absorbed by the mitochondria. The absorbed light stimulates a series of biochemical reactions that lead to:

- **Increased ATP Production:** The primary mechanism of photobiomodulation is the stimulation of mitochondrial activity, resulting in higher ATP production. This energy is used by cells to perform essential functions, such as repair and regeneration. [12]
- **Reduced Inflammation:** Light therapy has been shown to reduce inflammation by modulating inflammatory processes at the cellular level. This is particularly beneficial for conditions like arthritis, muscle injuries, and chronic inflammation. [11]

- **Enhanced Tissue Repair:** The increased energy production in cells leads to faster tissue repair and regeneration, making photobiomodulation effective in wound healing and recovery from injuries. [11]

Frequencies and Harmonics:

Frequency Therapy involves the use of specific vibrational frequencies, including harmonics, to target various physiological functions and support overall wellness. A broad spectrum of frequencies and harmonics resonate with different tissues and organs, helping to restore balance and harmony within the body's systems. Harmonics are multiples of a fundamental frequency, and when they interact with the body, they create resonant effects that enhance cellular communication and physiological function. Frequency therapy, enhanced by harmonics, is used to address a variety of health conditions by tuning into frequencies that correspond to different bodily functions. Key health applications include:

- **Discomfort Relief:** Specific frequencies can alleviate pain by interacting with nerve signals and reducing the perception of pain. [13]
- **Neurological Support:** Frequency therapy supports neurological function, helping to manage conditions such as migraines, tinnitus, and even symptoms of neurodegenerative diseases. [14]
- **Stress Reduction:** Frequencies can promote relaxation and reduce stress by influencing the autonomic nervous system, leading to a calming effect on the body and mind. [15]
- **Enhancing Cellular Communication:** Harmonic frequencies synchronize cellular communication, leading to improved coordination of biological processes. [13]

- Supporting Natural Processes: Resonant effects from harmonics may assist the body's natural functions, aiding in the more efficient removal of cellular waste. [16]
- Supporting Homeostasis: Resonance helps maintain the body's natural balance by aligning its energies with the harmonic frequencies generated by the BioCharger. [17]

Patents and Legal Information

The innovations protected by the BioCharger's patents have a profound impact on wellness, offering users a powerful tool for improving health and enhancing quality of life. Here's how these innovations contribute to wellness:

Simultaneous Multi-Energy Delivery

The BioCharger is the only device of its kind that can simultaneously deliver four distinct energy types—PEMF, light therapy, frequencies and harmonics, and voltage. This simultaneous delivery is made possible by the patented multi-wave oscillator and electromagnetic field generation technologies. By targeting multiple aspects of cellular function at once, the BioCharger provides a comprehensive approach to wellness, addressing a wide range of health challenges in a single session.

Advanced Control and Personalization

The patented technology within the device allows users to adjust the frequencies and intensities of the energy fields based on their preferences. Sessions can be tailored to focus on specific wellness goals, such as recovery, improved circulation, enhanced mental clarity, or recovery support. This ability to personalize sessions ensures they align with the user's unique needs, optimizing potential benefits.

Patent Portfolio

The BioCharger NG is protected by several U.S. patents, each covering critical innovations that contribute to its unique capabilities in wellness technology. These patents ensure that the BioCharger NG remains at the forefront of health optimization by safeguarding its advanced methods for generating and applying electromagnetic fields. The BioCharger NG is also protected by international patents across multiple countries, including Canada, France, Germany, the Netherlands, Ireland, Sweden, Switzerland, the United Kingdom, Mexico, and the European Patent Convention. These patents cover similar technologies and methods, ensuring that the BioCharger's innovations are safeguarded on a global scale.

United States Patents

US10252072B2: This patent covers a system and method for generating high-voltage, variable-frequency electromagnetic fields. The technology is designed to mimic natural electromagnetic fields, which are essential for cellular health and vitality. It plays a crucial role in supporting wellness applications by delivering precise and targeted therapeutic effects.

US11420070B2: This patent focuses on enhancing the therapeutic effects of high-voltage, variable-frequency electromagnetic fields. It protects innovations that allow for the customization and optimization of these fields to meet specific wellness needs, further enhancing the BioCharger's ability to support overall health.

US11572765:

International (PCT) Patents

WO2015187821A2

WO2015187821A3

Canada (CA 2988075, CA D1 3203401)



France (FR 15732098.7, FR D1 18193831.7)

Germany (DE 15732098.7, DE D1 18193831.7)

Netherlands (NL 15732098.7, NL D1 18193831.7)

Ireland (IE 15732098.7, IE D1 18193831.7)

Sweden (SE 15732098.7, SE D1 18193831.7)

Switzerland (CH 15732098.7, CH D1 18193831.7)

United Kingdom (GB 15732098.7, GB D1 18193831.7)

Mexico (MX 2016016000, MX 2019003469A, MX 2022008271, MX 363546)

European Patent Convention (EP D2 22159414.6, EP 3151915A2, EP 3151915B1, EP 3508251A1, EP 3508251B1, EP 4079371A1)

Certifications and Compliance

These certifications and compliance marks are not just technical requirements; they are a testament to the BioCharger's commitment to safety, quality, and excellence. The CE marking, FCC marking, and ISO 9001:2015 certification, collectively ensure that the BioCharger NG meets the highest standards of safety and quality. These certifications provide users with the confidence that they are investing in a product that is both effective and safe to use, backed by rigorous testing and international regulatory approvals.

CE Marking:

The BioCharger NG is CE marked as per ISO 9001:2015, indicating its conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). The CE marking is a key indicator of the BioCharger's compliance with EU legislation, ensuring that the device meets all applicable requirements



for safety and quality. This certification is essential for the BioCharger's distribution across Europe, validating its compliance as a wellness technology.

FCC Marking:

The BioCharger NG is also FCC marked, which means it complies with the Federal Communications Commission (FCC) regulations for electromagnetic interference (EMI). The FCC marking certifies that the BioCharger meets the standards required to prevent interference with other electronic devices, ensuring that it operates safely and effectively within its designated electromagnetic spectrum. This certification is crucial for the BioCharger's use in the United States, where stringent regulations govern the emission of electromagnetic fields.

ISO 9001:2015 Certification:

The BioCharger NG is manufactured in a facility that is ISO 9001:2015 certified, which means that the production processes adhere to internationally recognized quality management standards. ISO 9001:2015 certification ensures that the BioCharger is consistently produced with high quality, reliability, and precision. This certification reflects the company's dedication to continuous improvement, customer satisfaction, and operational excellence.

Illegal Implications and Innovation Protection

The patents protecting the BioCharger NG are critical to its position as a leader in energy wellness technology. These legal protections ensure that the BioCharger's innovative



methods and systems remain exclusive, preventing unauthorized replication and safeguarding the device's unique capabilities.

- **Exclusive Rights:** The patents grant Advanced Biotechnologies, LLC exclusive rights to manufacture, sell, and distribute the BioCharger NG, ensuring that the technology remains proprietary and inaccessible to competitors. This exclusivity allows the company to continue innovating and improving the BioCharger without the risk of imitation.
- **Global Protection:** The international patents provide comprehensive protection across multiple jurisdictions, ensuring that the BioCharger's innovations are safeguarded globally. This global protection is essential for maintaining the BioCharger's market leadership and expanding its reach in the wellness industry.
- **Ongoing Innovation:** The BioCharger's commitment to ongoing research and development is reflected in its continuous patent filings and renewals. By securing and maintaining patents, Advanced Biotechnologies, LLC ensures that the BioCharger NG remains at the forefront of energy-based wellness technology, offering users the most advanced and effective solutions available.

PEMF Research References

1. [Coupling of pulsed electromagnetic fields \(PEMF\) therapy to molecular grounds of the cell](#)

Funk RH. Coupling of pulsed electromagnetic fields (PEMF) therapy to molecular grounds of the cell. Am J Transl Res. 2018 May 15;10(5):1260-1272. PMID: 29887943; PMCID: PMC5992548.

2. [Effects of PEMF on microcirculation and angiogenesis in a model of acute hindlimb ischemia in diabetic rats](#)

Pan, Y., Dong, Y., Hou, W., Ji, Z., Zhi, K., Yin, Z., ... & Chen, Y. (2013). Effects of PEMF on microcirculation and angiogenesis in a model of acute hindlimb ischemia in diabetic rats. Bioelectromagnetics, 34(3), 180-188.

3. [Effects of Pulsed Electromagnetic Field \(PEMF\) Therapy on Bone Healing: A Review](#)

Di Bartolomeo M, Cavani F, Pellacani A, Grande A, Salvatori R, Chiarini L, Nocini R, Anesi A. Pulsed Electro-Magnetic Field (PEMF) Effect on Bone Healing in Animal Models: A Review of Its Efficacy Related to Different Type of Damage. Biology (Basel). 2022 Mar 5;11(3):402. doi: 10.3390/biology11030402. PMID: 35336776; PMCID: PMC8945722.

4. [A randomized, double-blind, placebo-controlled clinical trial using a low-frequency magnetic field in the treatment of musculoskeletal chronic pain](#)

Thomas AW, Graham K, Prato FS, McKay J, Forster PM, Moulin DE, Chari S. A randomized, double-blind, placebo-controlled clinical trial using a low-frequency magnetic field in the treatment of musculoskeletal chronic pain. Pain Res Manag. 2007 Winter;12(4):249-58. doi: 10.1155/2007/626072. PMID: 18080043; PMCID: PMC2670735.

5. [The Science of PEMF](#)

Gordon, Garry F. "The Science of PEMF." Gordon Research Institute (2012).

Pulsed Electric Field (Voltage) Therapy Research References

6. [Bioactive polymeric materials and electrical stimulation strategies for musculoskeletal tissue repair and regeneration](#)

Bryan Ferrigno, Rosalie Bordett, Nithyadevi Duraisamy, Joshua Moskow, Michael R. Arul, Swetha Rudraiah, Syam P. Nukavarapu, Anthony T. Vella, Sangamesh G.

Kumbar, Bioactive polymeric materials and electrical stimulation strategies for musculoskeletal tissue repair and regeneration, Bioactive Materials, Volume 5, Issue 3, 2020, Pages 468-485, ISSN 2452-199X,

[*https://doi.org/10.1016/j.bioactmat.2020.03.010.*](https://doi.org/10.1016/j.bioactmat.2020.03.010)

7. [Characterization of Cell Membrane Permeability In Vitro Part I: Transport Behavior Induced by Single-Pulse Electric Fields](#)

Sweeney DC, Weaver JC, Davalos RV. Characterization of Cell Membrane

Permeability In Vitro Part I: Transport Behavior Induced by Single-Pulse Electric Fields. Technology in Cancer Research & Treatment. 2018;17.*

doi:10.1177/1533033818792491

8. [Application of Pulsed Electric Fields in Wound Healing](#)

Berry-Kilgour C, Wise L, King J, Oey I. Application of pulsed electric field technology to skin engineering. Front Bioeng Biotechnol. 2024 Apr 16;12:1386725.

doi: 10.3389/fbioe.2024.1386725. PMID: 38689761; PMCID: PMC11058833.

9. [The Use of Pulsed Electromagnetic Field to Modulate Inflammation and Improve Tissue Regeneration: A Review](#)

Ross, C. L., Zhou, Y., McCall, C. E., Soker, S., & Criswell, T. L. (2019). The use of pulsed electromagnetic field to modulate inflammation and improve tissue

regeneration: A review. *Bioelectricity*, 1(4), 247-259.

<https://doi.org/10.1089/bioe.2019.0026>

10. [Pulsed Electric Fields for Tumor Treatment](#)

Nuccitelli R. *Application of Pulsed Electric Fields to Cancer Therapy. Bioelectricity*. 2019 Mar 1;1(1):30-34. doi: 10.1089/bioe.2018.0001. Epub 2019 Mar 18. PMID: 34471806; PMCID: PMC8370244.

Light Therapy Research References

11. [Low-level laser \(light\) therapy \(LLLT\) in skin: stimulating, healing, restoring](#)

Avci P, Gupta A, Sadasivam M, Vecchio D, Pam Z, Pam N, Hamblin MR. *Low-level laser (light) therapy (LLLT) in skin: stimulating, healing, restoring. Semin Cutan Med Surg*. 2013 Mar;32(1):41-52. PMID: 24049929; PMCID: PMC4126803.

12. [Light-emitting diode therapy in exercise-trained mice increases muscle performance, cytochrome c oxidase activity, ATP and cell proliferation](#)

Ferraresi, C., Parizotto, N.A., Pires de Sousa, M.V., Kaippert, B., Huang, Y.-Y., Koiso, T., Bagnato, V.S. and Hamblin, M.R. (2015), *Light-emitting diode therapy in exercise-trained mice increases muscle performance, cytochrome c oxidase activity, ATP and cell proliferation. J. Biophoton*, 8: 740-754.
<https://doi.org/10.1002/jbio.201400087>

Frequency Therapy Research References

13. [Frequency-Specific Microcurrent for Pain Management](#)

McMakin CR, Oschman JL. *Visceral and somatic disorders: tissue softening with frequency-specific microcurrent. J Altern Complement Med*. 2013 Feb;19(2):170-7. doi: 10.1089/acm.2012.0384. Epub 2012 Jul 9. PMID: 22775307; PMCID: PMC3576917.

14. [Resonant Frequency Therapy: A Novel Approach for the Treatment of Tinnitus](#)

Peter N, Kleinjung T. Neuromodulation for tinnitus treatment: an overview of invasive and non-invasive techniques. *J Zhejiang Univ Sci B*. 2019 Feb.;20(2):116-130. doi: 10.1631/jzus.B1700117. Epub 2018 Mar 12. PMID: 29770647; PMCID: PMC6380997.

Harmonics and Resonance Research References

15. [The Role of Harmonics in Human Physiological Regulation](#)

Feaver RE, Gelfand BD, Blackman BR. Human haemodynamic frequency harmonics regulate the inflammatory phenotype of vascular endothelial cells. *Nat Commun*. 2013;4:1525. doi: 10.1038/ncomms2530. PMID: 23443553; PMCID: PMC4100071.

16. [Cellular Resonance and Its Applications in Biomedical Research](#)

Echlin M, Aguilar B, Shmulevich I. Characterizing the Impact of Communication on Cellular and Collective Behavior Using a Three-Dimensional Multiscale Cellular Model. *Entropy (Basel)*. 2023 Feb 9;25(2):319. doi: 10.3390/e25020319. PMID: 36832685; PMCID: PMC9955575.

17. [Shattering Cancer with Resonant Frequencies: Anthony Holland at TEDxSkidmoreCollege](#)

Holland, A. (2013, November 18). Shattering cancer with resonant frequencies. TEDxSkidmoreCollege. https://www.youtube.com/watch?v=1w0_kazbb_U

Pulsed Electromagnetic Field (PEMF) and Light Therapy Research References

18. [Therapeutic application of light and electromagnetic fields to reduce hyper-inflammation triggered by COVID-19](#)

Pooam, M., Aguida, B., Drahy, S., Jourdan, N., & Ahmad, M. (2021). Therapeutic application of light and electromagnetic fields to reduce hyper-inflammation triggered by COVID-19. *Communicative & Integrative Biology*, 14(1), 66–77. <https://doi.org/10.1080/19420889.2021.1911413>