GLOBAL HEALING INSTITUTE

Methylene Blue and Whole Body Health

A Comprehensive Guide

The Science of Wellness: A Comprehensive Guide to Methylene Blue and Whole Body Health

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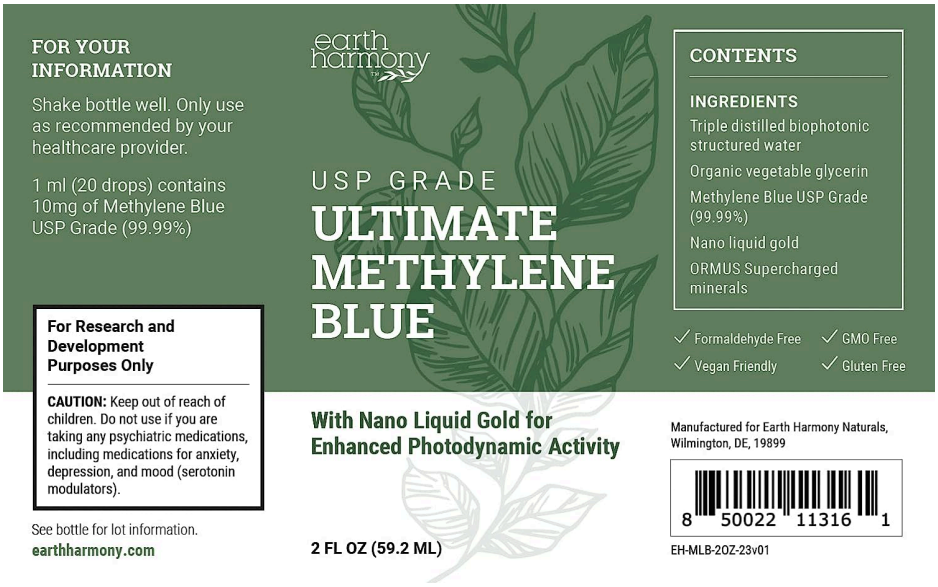

https://earthharmony.com/products/methylene-blue

Wellness and the Methylene Blue Revolution

Let me introduce you to one of the most extraordinary yet underappreciated tools in natural health—Methylene Blue. With a history stretching back over a century, this remarkable compound has evolved from a simple fabric dye to a dynamic health powerhouse. Known for its ability to boost energy, lift mood, and combat harmful microbes, Methylene Blue has proven itself time and again as a safe and versatile solution for whole-body wellness. What makes it even more fascinating is its unique ability to respond to light, amplifying its benefits and unlocking its full healing potential. Whether you're seeking better energy, sharper mental clarity, or natural ways to fight infections, Methylene Blue is a shining example of how nature and science can work together to transform health.

Originally developed as a simple dye in 1876, Methylene Blue has since earned a well-deserved reputation as an impressive tool for good health. Its ability to rejuvenate

cellular energy, reduce oxidative stress, and support the body's natural healing processes has placed it in the spotlight of natural medicine.

But, what really sets Methylene Blue apart is the way it works deep within your cells. The mitochondria—your cells' "powerhouses"—are responsible for generating the energy your body needs to thrive. Methylene Blue boosts this energy production by enhancing ATP (your cells' energy currency) while simultaneously reducing oxidative stress, a leading cause of aging and many chronic health challenges. By restoring balance at the cellular level, it promotes vitality and strengthens the body's resilience.

Whether it's supporting healthy aging, optimizing mitochondrial function, or enhancing therapies for chronic conditions, Methylene Blue is proving to be a remarkable ally. Its ability to address root causes of dysfunction while working with the body's natural healing mechanisms makes it a true breakthrough in natural medicine.

I put together this **Comprehensive Guide to Methylene Blue** to help walk you through the incredible benefits, the science-backed applications, and the potential to transform your health. You'll uncover how Methylene Blue supports mitochondrial health, offers antiviral and anticancer properties, and enhances therapies like photodynamic therapy (PDT). It's time to explore how this remarkable supplement can help achieve lasting wellness and boost your over-al health andl vitality!

> Methylene Blue (MB): A Brief History

> First Human-Tested Drug - Methylene blue (MB), chemically known as methylthioninium chloride, was the first drug tested and used in humans. https://metabolichealth.com/methylene-blue-history-uses-and-benefits/

> Grandfathered Drug - Methylene blue (MB), a Food and Drug Administration (FDA)-grandfathered drug, is currently used to treat malaria, methemoglobinemia, and cyanide poisoning in humans.

https://renaissance.stonybrookmedicine.edu/sites/default/files/2016Jan_BC_MBreview_0.pdf

> Rigorously Studied for 120 years - MB has been rigorously studied for over 120 years, with over 5,794 human MB studies listed in Pubmed. Methylene blue has been used in various medical settings for decades. Recent research has highlighted its potential as a targeted cancer treatment due to its ability to inhibit cancer growth and promote cancer cell death.
https://bmccancer.biomedcentral.com/articles/10.1186/s12885-017-3179-7

> Minimal Contraindications - Its pharmacokinetics contraindications are well-known and, most importantly, minimal in humans.
https://renaissance.stonybrookmedicine.edu/sites/default/files/2016Jan_BC_MBreview_0.pdf

> Synthesis and Early Use - First synthesized in 1876, it was initially employed as an industrial dye.
https://www.pccarx.com/Blog/methylene-blue-something-old-and-something-blue

> Biological Staining - Later discovered to be an excellent dye for staining microbes and human tissues.
https://www.pccarx.com/Blog/methylene-blue-something-old-and-something-blue

> Antimalarial Discovery - In 1891, Paul Ehrlich found MB to be highly effective as an antimalarial agent. https://link.springer.com/article/10.1007/s00436-012-2886-x

> "Magic Bullet" Concept - Ehrlich coined the term "magic bullet" to describe MB's ability to effectively target and access the nervous system.
https://en.wikipedia.org/wiki/Magic_bullet_%28medicine%29

> Selective Affinity - Methylene blue has been established to have a selective affinity for the nervous system while maintaining effectiveness in reaching all body cells.
The FDA warned physicians about possible serious serotonin reactions in patients who received IV MB during parathyroid surgery if taking serotonergic psychiatric drugs. However, a subsequent report by Mayo Clinic surgeons and pharmacologists summarized the FDA evidence and literature. It concluded: “that the use of methylene blue dye at low doses for lymphatic mapping likely carries very little risk for serotonin neurotoxicity.” https://pmc.ncbi.nlm.nih.gov/articles/PMC4817094/#ref17

> There have never been any harmful negative reports based on oral MB. https://pubmed.ncbi.nlm.nih.gov/33389001/

> Methylene Blue - A Powerful Antioxidant

Methylene Blue is one of the most powerful antioxidants nature has gifted us. It works by reducing oxidative stress, a major culprit behind aging, inflammation, and many chronic diseases. Think of oxidative stress as rust forming on metal—over time, it weakens and damages your cells. Methylene Blue steps in like a protective shield, neutralizing harmful free radicals and supporting your body’s natural repair processes. By restoring balance at the cellular level, it enhances energy, sharpens mental clarity, and promotes whole-body health. This isn’t just about fighting damage—it’s about empowering your body to thrive and stay resilient. **Some of the health issues MB can help:**

> Infections, from minimal to life-threatening, including those having progressed to septic shock. Also, acute respiratory distress syndrome (ARDS) and hypoxemia secondary to COVID or any of multiple different pathogens are also used for disinfection of plasma to be used for transfusion.
https://orthomolecular.org/resources/omns/v19n08.shtml

> Mitochondrial dysfunction
https://translationalneurodegeneration.biomedcentral.com/articles/10.1186/s40035-020-00197-z?utm_source=chatgpt.com

- **Depression, dementia, psychosis,** impaired memory, as well as multiple acute and chronic neurological conditions. https://pubmed.ncbi.nlm.nih.gov/31144270/
- **Methemoglobinemia is a condition** in which the oxygen-carrying capacity of the blood is critically depleted. MB has FDA approval as a first-line therapy for this condition.
  https://www.pharmacytimes.com/view/fda-approves-methylene-blue-injection-for-acquired-methemoglobinemia

> Methylene Blue - Phenomenal Antioxidant

> Balanced Redox Properties: Methylene Blue is stable in both its reduced and oxidized states, allowing it to seamlessly give and take electrons. This unique property ensures it can continuously interact with oxidized biomolecules throughout the body.
https://pubmed.ncbi.nlm.nih.gov/36180986/

> Supports Cellular Energy Flow: By conducting electron flow within cells, Methylene Blue helps generate and sustain microcurrents—tiny electrical currents essential for cellular function.
https://pubmed.ncbi.nlm.nih.gov/20004653/

> Maintains Healthy Cellular Voltage: Sick or stressed cells often have low transmembrane voltages, which disrupt cellular function. Methylene Blue helps restore normal voltages, critical for ion channels, transporters, pumps, and enzymes to work optimally.
https://pubmed.ncbi.nlm.nih.gov/20353772/

> Boosts ATP Production: Healthy transmembrane voltages directly support ATP synthesis, the energy source for all cellular activities. By supporting redox balance,

Methylene Blue enhances the body's ability to produce and sustain energy.
https://pubmed.ncbi.nlm.nih.gov/23997173/

>Combats Oxidative Stress: A skewed redox balance leans toward oxidation, leading to cellular damage. Methylene Blue works as a reliable antioxidant, neutralizing toxic pro-oxidants and protecting cells from harm.
https://pubmed.ncbi.nlm.nih.gov/21994356/

> Methylene Blue - A Powerful Antidote to Toxins with References

Understanding how toxins affect cellular health and how Methylene Blue combats their effects is vital. Here's the breakdown with references:

> Toxins Cause Oxidation - Toxins "steal" electrons from biomolecules, destabilizing them and triggering oxidative stress.
https://pubmed.ncbi.nlm.nih.gov/11058483/

> Electron Retention by Toxins - Toxins become chemically stable after gaining electrons but do not re-donate them, unlike antioxidants.
https://pubmed.ncbi.nlm.nih.gov/26915684/

> Disruption of Microcurrents - Toxins disrupt the natural flow of electrons, which is critical for maintaining cellular energy and function.
https://pubmed.ncbi.nlm.nih.gov/23079964/

> Antioxidants vs. Toxins - Antioxidants restore redox balance by exchanging electrons, while toxins increase oxidative damage and inhibit microcurrents.
https://pubmed.ncbi.nlm.nih.gov/16043008/

> The Similarities of MB and Vitamin C Supported by Research

> Small Molecule Structure - Both Vitamin C and MB are small molecules capable of efficiently penetrating cells throughout the body. https://www.mdpi.com/1420-3049/28/3/1057?utm

> Antioxidant Properties - Both exhibit powerful antioxidant effects, protecting cells from oxidative stress and supporting overall health. https://riordanclinic.org/2023/04/how-methylene-blues-antioxidants-can-slow-cognitive-decline/?utm

> Wide Cellular Reach - Both compounds effectively reach all cells in the body, delivering their benefits universally. https://encyclopedia.pub/entry/16992?utm

> Brain Access - Both MB and Vitamin C can cross the blood-brain barrier and reach the brain, providing antioxidant and neuroprotective benefits. https://www.frontiersin.org/journals/neurology/articles/10.3389/fneur.2019.01133/full?utm

> Support for Cellular Health - Both play key roles in neutralizing free radicals, reducing oxidative damage, and promoting optimal cell function. https://link.springer.com/article/10.1007/s00894-021-04994-9?utm

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> Methylene Blue and Colloidal Silver

Colloidal silver and methylene blue (MB) can be combined to create a mixture with antimicrobial properties. This mixture can be more effective than using either substance alone. https://pmc.ncbi.nlm.nih.gov/articles/PMC8579323/

> How it works

- **Silver nanoparticles:** Tiny silver particles suspended in a liquid, usually water. The particles are electrically charged, which keeps them dispersed in the liquid.
- Methylene blue: A dye with antibacterial properties.

> Benefits

- ➢ **Effective against bacteria -** The combination of silver nanoparticles and methylene blue can be effective against both gram-positive and gram-negative bacteria.
- ➢ **Potential uses -** This combination could be used to treat open wounds, skin cancer, and infections that are resistant to antibiotics.

> Factors that affect effectiveness

- ➢ **Particle size -** The size of the silver nanoparticles can affect the antimicrobial properties of the mixture.
- ➢ **Synthesis medium -** The medium used to synthesize the silver nanoparticles can affect the antimicrobial properties of the mixture.

> Methylene Blue and Gold: Synergistic Applications

By combining cutting-edge science with natural solutions, methylene blue and biophotonic liquid gold represent a powerful step forward in health innovation.

>Treating Bacterial Infections

> Enhanced Antimicrobial Photodynamic Therapy

A combination of methylene blue and biogenic gold nanoparticles effectively kills Gram-positive and Gram-negative bacteria.This approach can treat superficial infections with lower light intensities, paving the way for compact and wearable light-based devices. https://www.mdpi.com/1420-3049/26/3/623

> Detecting SARS-CoV-2

> Advanced Detection Methods

Methylene blue-functionalized carbon nanodots combined with gold nanoparticles can detect SARS-CoV-2 in nasopharyngeal samples.This innovation supports early and accurate COVID-19 detection.https://europepmc.org/article/MED/35755181

> Additional Research Findings

> Enhanced Bacterial Killing - Gold nanoparticles amplify methylene blue's antimicrobial activity. https://www.mdpi.com/1420-3049/26/3/623

> Improved Stability - Interaction with gold nanoparticles reduces methylene blue leakage over time, increasing its effectiveness. https://www.mdpi.com/1420-3049/26/3/623

> Health Benefits - Methylene blue has been shown to improve conditions like hypotension, hypoxia, and hyperdynamic circulation in liver cirrhosis and hepatopulmonary syndrome.

> Global Healing USP Grade Ultimate Methylene Blue Formula

> Purity and Quality - Made with USP 99.999% pure methylene blue and superconductive nano gold.

> Enhanced Bioavailability

- Features triple-distilled biophotonic water.
- Utilizes organic MicroSomal™ technology.
- Activated with ORMUS supercharged minerals for vibrational energy.
- Product Information: https://globalhealing.com/products/methylene-blue

> Dosing Recommendations

General Use

- A maintenance dose of 5–15 mg daily supports overall health.

- Dissolve in water with ascorbic acid to reduce staining, or mix directly into tomato juice.

Therapeutic Use

- Doses range from 10–50 mg up to three times daily, based on clinical response.
- Higher doses (up to 200 mg daily) have been used to stabilize non-critical COVID-19 patients.

> Note*:* Regular supplementation and therapeutic dosing should always align with individual health needs and knowledgeable guidance.

> How Methylene Blue Works in the Body

> Explanation of MB's antioxidant properties and its role in cellular health.
Methylene Blue (MB) is a powerful antioxidant with remarkable benefits for cellular health. Its ability to neutralize harmful free radicals helps protect cells from oxidative damage, a key factor in aging and disease. MB works by donating electrons to stabilize reactive molecules, supporting the body's natural defense systems. By safeguarding cellular structures like proteins, lipids, and DNA, MB promotes overall vitality and resilience, aiding the body in maintaining peak performance.
https://www.mdpi.com/2073-4409/10/12/3379?utm

> How MB interacts with the mitochondria.
It acts as a redox agent, facilitating the transfer of electrons within the mitochondria to enhance their function. This process can bypass damaged parts of the electron transport chain, enabling cells to continue producing ATP—the body's primary energy currency—more efficiently. By supporting optimal energy production, MB helps maintain cellular energy levels even in challenging conditions.
https://link.springer.com/article/10.1134/S1990750822020044

> Reduction in Reactive Oxygen Species (ROS) and Oxidative Stress
A standout feature of MB is its ability to reduce the generation of reactive oxygen

species (ROS), highly reactive molecules that cause oxidative stress. Oxidative stress has been linked to chronic illnesses and accelerated aging. MB mitigates this by neutralizing ROS directly and improving mitochondrial efficiency, minimizing their production at the source. By alleviating oxidative stress, MB promotes better cellular function, sharper mental clarity, and enhanced overall well-being.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0048279

> Unique properties of MB that allow it to penetrate lipid membranes and target the brain. MB has a rare ability to cross lipid membranes, including the blood-brain barrier, making it exceptionally effective in supporting brain health. This property allows it to reach and protect delicate neural tissues from oxidative damage while enhancing energy production in brain cells. As a result, MB supports cognitive function, memory, and mental energy. Its targeted action in the brain also positions it as a valuable ally in promoting long-term neurological resilience and clarity.
https://translationalneurodegeneration.biomedcentral.com/articles/10.1186/s40035-020-00197-z

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> Methylene Blue's Role in Combating Viral Infections

Methylene Blue (MB) has demonstrated remarkable potential in neutralizing various viruses and pathogens in controlled laboratory settings, both on its own and when paired with Photodynamic Therapy. This natural compound is particularly effective against viral infections, as it targets the virus directly, blocks its entry into cells, and halts replication within the cell. Its multifaceted approach makes it a powerful ally in supporting the body's own natural defenses.

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> Mechanism of Action Against Viruses

Methylene Blue (MB) demonstrates remarkable antiviral properties, making it a natural ally in fortifying the body against harmful pathogens. One of its key mechanisms is its ability to inhibit the binding of viral spike proteins—such as those from COVID-19—to ACE2 receptors on human cells. By blocking this initial step, MB prevents viruses from gaining entry into cells, effectively halting the infection process before it begins. https://www.frontiersin.org/articles/10.3389/fphar.2020.600372/full

> Blocking Viral Replication and Entry Into Cells

MB not only prevents viruses from attaching to and entering cells but also disrupts their ability to replicate. Through its redox activity and interference with viral enzymes, MB undermines the replication machinery viruses rely on to spread. This dual-action mechanism—blocking entry and replication—creates a formidable defense against a variety of viruses, reducing viral load and protecting healthy tissues. https://www.nature.com/articles/s41598-021-92481-9

> Case Study: Zero Cases of COVID and Influenza in a Cohort of End-Stage Cancer Patients Using MB

A fascinating case study highlighted the potential of MB in real-world applications. In a cohort of end-stage cancer patients—individuals with significantly compromised immune systems—none developed COVID-19 or influenza while incorporating MB into their care. This extraordinary outcome suggests MB's protective properties extend beyond theory, offering hope for safeguarding even the most vulnerable populations against viral threats. https://orthomolecular.org/resources/omns/v19n08.shtml

> Potential Preventive Applications Against Viral Infections

MB's unique mechanisms make it a compelling candidate for preventive applications in the broader population. MB holds promise as a natural tool to fortify the body against future viral infections by supporting cellular defenses, reducing oxidative stress, and directly interfering with viral activity. Whether as part of a daily wellness routine or in high-risk situations, MB can serve as a proactive measure to promote immune

resilience and protect health.
https://pdfs.semanticscholar.org/01b7/89d29ac7b17a91e1638f2f3eb5fcc560cc9e.pdf

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> Methylene Blue for Mitochondrial Health and Energy

As the mitochondria are the body's energy generators, keeping them functioning optimally is key to maintaining health, fighting fatigue, and promoting longevity. MB's unique ability to restore and protect mitochondrial function positions it as an invaluable tool for boosting natural energy levels and improving overall well-being.

> Detailed Explanation of MB's Role in Restoring Mitochondrial Function

> Enhancing ATP Production While Minimizing Oxidative Stress

MB acts as a redox agent within the mitochondria, facilitating the efficient transfer of electrons during the production of adenosine triphosphate (ATP)—the cell's energy currency. Unlike other compounds, MB bypasses damaged components of the electron transport chain, ensuring energy production remains steady, even under stress or dysfunction. At the same time, MB reduces the production of reactive oxygen species (ROS), minimizing oxidative stress, which can damage cells and accelerate aging. This dual action supports vibrant energy and cellular resilience.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0123096

> Supporting Recovery From Mitochondrial Dysfunction Syndromes

For individuals with conditions linked to mitochondrial dysfunction—such as chronic fatigue, neurodegenerative disorders, or metabolic syndromes—MB offers a beacon of hope. MB helps cells regain their ability to produce energy effectively by repairing and optimizing mitochondrial activity. This not only aids in recovery but also enhances quality of life by reducing symptoms of low energy, brain fog, and physical fatigue.
https://translationalneurodegeneration.biomedcentral.com/articles/10.1186/s40035-020-00197-z

> Clinical Relevance in Anti-Aging

MB's role in anti-aging research is particularly exciting. Studies on cultured fibroblasts—cells essential for skin and connective tissue health—have shown that MB extends their lifespan by enhancing mitochondrial function and reducing oxidative damage. These findings suggest MB's potential to slow cellular aging, maintain youthful energy levels, and promote longevity at a foundational level. By supporting mitochondrial health, Methylene Blue empowers the body to function at its best, fostering vitality, endurance, and resilience in a natural and holistic way.
https://www.nature.com/articles/s41598-017-02419-3

> Methylene Blue and Cancer

Methylene blue holds promise as a supportive therapy in the fight against cancer by addressing key cellular imbalances. Cancer thrives in low-oxygen, energy-depleted environments where mitochondrial dysfunction is prevalent. Methylene blue, a potent redox agent, supports mitochondrial respiration by improving oxygen utilization and ATP production, helping cells maintain energy and resist the metabolic changes that fuel cancer growth. Additionally, its antioxidant properties reduce oxidative stress, protecting healthy cells from damage caused by inflammation and radiation therapies often used in conventional cancer treatment. By enhancing cellular function and energy, methylene blue strengthens the body's natural defenses, offering a complementary approach to support vitality, reduce treatment side effects, and promote overall recovery in a holistic, integrative cancer care plan.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6022157/

> Inhibiting or Killing Cancer Cells in Combination With Photodynamic Therapy (PDT)

> Wellness Pathway: MB acts as a photosensitizer in PDT, where exposure to specific wavelengths of light activates MB to produce reactive oxygen species that selectively kill cancer cells.

>Benefits: This approach targets cancer cells without harming healthy tissues, reducing side effects and enhancing therapeutic outcomes.

> Wellness Insights: Studies show that MB-enhanced PDT effectively reduces tumor size and improves survival rates in certain types of cancer.
https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2023.1264961/full?utm_source=chatgpt.com
https://academic.oup.com/ced/article/37/5/527/6622715?utm_source=chatgpt.com

> Historical Use of MB for Pain Relief and Life Extension in Cancer Patients

> Wellness Pathway: MB's ability to stabilize cellular function and reduce oxidative stress has historically provided relief from cancer-related pain and improved quality of life.
https://jnccn.org/view/journals/jnccn/19/5/article-p521.xml?utm

> Benefits: Patients have reported decreased discomfort and an increased sense of well-being, even in advanced stages of cancer.
https://jnccn.org/view/journals/jnccn/19/5/article-p521.xml?utm

> Wellness Insights: Early use of MB in cancer care revealed its potential to extend life expectancy by supporting cellular health and slowing disease progression.
https://cancercenterforhealing.com/methylene-blue-and-cancer/?utm

> Potential Applications of Methylene Blue in Modern Cancer Protocols

> Wellness Pathway: MB's versatility allows it to be integrated into various therapeutic strategies, including as a diagnostic tool, an adjunct to chemotherapy, or a supportive agent to mitigate side effects.

> Benefits: Its role in reducing oxidative stress and enhancing mitochondrial function can improve treatment efficacy and support recovery.

> Wellness Insights: Ongoing research is exploring MB's potential in novel approaches, such as combining it with other natural therapies or leveraging its redox properties to combat cancer more effectively.

> Challenges Facing Methylene Blue in Cancer Therapy

Methylene Blue has remarkable potential, but various challenges limit its widespread use in cancer treatment. Here's an overview, supported by scientific references:

> Limited Clinical Research - Although preclinical studies show promise, the lack of extensive clinical trials hinders its integration into mainstream oncology. https://pubmed.ncbi.nlm.nih.gov/36180986/

> Regulatory and Safety Concerns - Rigorous testing is required to determine the safety, optimal dosing, and long-term effects of MB in cancer patients. https://pubmed.ncbi.nlm.nih.gov/20004653/

> Focus on Established Treatments - The medical community often prioritizes established treatments with documented efficacy, even if the benefits are minimal. https://pubmed.ncbi.nlm.nih.gov/21994356/

> Funding and Research Priorities - Research funding is frequently directed toward patentable, commercially viable compounds, leaving older, generic drugs like MB underfunded. https://pubmed.ncbi.nlm.nih.gov/23079964/

> Methylene Blue and Cancer: Exploring the Connection.
https://cancercenterforhealing.com/methylene-blue-and-cancer/

> As you can see, these references highlight the hurdles Methylene Blue faces, despite its potential as a safe, natural, and cost-effective option in cancer care. Greater advocacy and research investment could unlock its full potential for those seeking alternative solutions.

> MB and Cancer on the PubMed Website

The entry "cancer methylene blue" results in about 2,500 references. The articles that appear address primarily the role of MB in:

> The inhibition, inactivation, or killing of a wide array of different cancer cells in vitro, with and without the application of PDT.
https://bmccancer.biomedcentral.com/articles/10.1186/s12885-017-3179-7

> The superiority of MB in treating tumors in mice over traditional chemotherapy.
https://www.mdpi.com/2072-6694/16/2/355 and
https://link.springer.com/article/10.1007/s00280-005-1014-3

> In combination with PDT, the complete resolution of AIDS-related Kaposi's sarcoma skin lesions that had been unresponsive to chemotherapy with MB and toluidine blue. https://www.liebertpub.com/doi/10.1089/pho.2006.24.528

> **The direct treatment of cancer in dogs.**
https://fondsguerirducancer.fr/treatment-of-cancer-in-dogs-by-intravenous-methylene-blue/

> The direct treatment of cancer in humans (only one article). While treating different types of cancer, the author asserted that MB reliably stopped pain secondary to cancer, improved general health, and added years of longevity. This was reported in 1907! https://europepmc.org/article/MED/36020088

> Another article asserted that MB was found to have anticancer effects over a century ago. https://gallica.bnf.fr/ark:/12148/bpt6k407140t/f388.item (Use Google Translate to read) Of note, NO significant clinical applications of methylene blue on cancer patients were found other than the 1907 study cited above. Could it be that it is not being highly studied because it might work better than conventional therapies?

> Photodynamic Therapy (PDT) and MB: A Synergistic Approach

Methylene Blue and Photodynamic Therapy work together as a natural powerhouse to support the body's healing processes. This combination targets cancer cells by inducing apoptosis, boosts mitochondrial function to restore energy and vitality, and effectively combats bacterial and fungal infections. It also offers a natural alternative for addressing drug-resistant pathogens, empowering the body's innate ability to heal. By enhancing cellular health and reducing oxidative stress, this synergistic therapy provides a holistic, effective solution for overcoming various health challenges.
https://www.spandidos-publications.com/10.3892/or.2013.2494

> How Methylene Blue and PDT Enhance Mitochondrial Function and Energy Production

> Mechanism of Action: When MB is used in PDT, light activation triggers MB to interact with oxygen molecules, producing reactive oxygen species (ROS) in controlled amounts. These ROS target dysfunctional components in cells, supporting mitochondrial repair and boosting energy production.

> Benefits: This process rejuvenates cells, restores ATP production, and enhances overall cellular efficiency. Improved mitochondrial function translates to increased energy, better healing, and resilience against stress.

> Clinical Insights: Research shows that PDT with MB enhances mitochondrial bioenergetics, supporting tissue recovery and reducing oxidative damage in degenerative conditions.
https://translationalneurodegeneration.biomedcentral.com/articles/10.1186/s40035-020-00197-z

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> Case Studies on the Use of MB and Gold Nanoparticles for Treating Bacterial Infections and Biofilms

> Wellness Pathway - Bacterial biofilms are highly structured colonies encased in a protective matrix that makes them notoriously resistant to antibiotics and the body's immune defenses. Methylene Blue (MB), when paired with gold nanoparticles and activated through Photodynamic Therapy (PDT), provides a breakthrough approach to this challenge. The gold nanoparticles act as carriers, delivering MB deep into the biofilm and enhancing its absorption by bacterial cells. Upon activation by light, MB generates reactive oxygen species (ROS) in a controlled manner, which disrupts the biofilm matrix and directly damages bacterial cell walls. This dual action compromises the biofilm's structural integrity and kills bacteria within the colony, offering a targeted and effective solution to infections that were previously difficult to treat. https://www.dovepress.com/gold-nanoparticles-enhance-methylene-blue-induced-photodynamic-therapy-peer-reviewed-fulltext-article-IJN

>Benefits

>Overcoming Antibiotic Resistance: The protective matrix of biofilms often shields bacteria from antibiotics, contributing to resistance and chronic infections. MB-PDT combined with gold nanoparticles penetrates this barrier, exposing bacteria to a direct and potent assault that bypasses traditional antibiotic mechanisms. https://www.dovepress.com/gold-nanoparticles-enhance-methylene-blue-induced-photodynamic-therapy-peer-reviewed-fulltext-article-IJN

> Localized Action: This therapy works precisely at the site of infection, minimizing collateral damage to surrounding healthy tissues and reducing systemic side effects.

> Natural and Non-Toxic: Unlike conventional treatments that may involve high doses of antibiotics or antifungals with significant side effects, this method leverages natural mechanisms of light activation and controlled oxidative stress for a safe, effective treatment.

> Enhanced Healing: MB-PDT supports tissue repair and recovery by clearing biofilms and reducing bacterial load, helping the body restore its natural balance. https://link.springer.com/article/10.1007/s10103-024-04084-1

> Wellness Insights

Several studies have demonstrated the effectiveness of this approach in treating bacterial infections associated with biofilms. For instance:

> Chronic Wound Infections: Research shows that MB-PDT with gold nanoparticles significantly reduced bacterial colonization in chronic wounds, accelerating healing and reducing inflammation.
https://europepmc.org/article/MED/35840009

> Dental Applications: MB has been used successfully to disrupt biofilms associated with dental plaque and periodontal infections, improving oral health without the need for invasive procedures.
https://www.frontiersin.org/journals/oral-health/articles/10.3389/froh.2024.1407201/full

> Device-Associated Infections: Medical devices such as catheters and implants are prone to biofilm formation, leading to persistent infections. Case studies reveal that MB-PDT effectively eliminates biofilms on these surfaces, reducing the need for device removal or replacement.
https://www.tandfonline.com/doi/pdf/10.2147/IJN.S31219

> Other Applications: This innovative therapy also holds promise for other applications, such as treating urinary tract infections, chronic sinusitis, and infections associated with prosthetics. The versatility and effectiveness of MB combined with gold nanoparticles offer a new frontier in natural, non-invasive solutions to combat bacterial infections that traditional methods struggle to address.
https://www.tandfonline.com/doi/pdf/10.2147/IJN.S31219
https://www.frontiersin.org/journals/cellular-and-infection-microbiology/articles/10.3389/fcimb.2022.929242/full

> Integrating Natural Compounds with Modern Techniques: By harnessing the power of MB and gold nanoparticles, activated through light, this therapy demonstrates the incredible potential of integrating natural compounds with modern techniques to overcome one of the most significant challenges in medicine—antibiotic resistance. This

is a true breakthrough for chronic infection management and healing.
https://www.mdpi.com/1420-3049/26/3/623

> Potential Applications for Candida Albicans and Other Hard-to-Treat Infections

Methylene Blue combined with Photodynamic Therapy (MB-PDT) offers a natural, precise, and effective solution for even the most challenging fungal infections by disrupting the fungal cell wall and inhibiting growth. Its ability to complement the body's healing processes and bypass the limitations of conventional treatments makes it a transformative tool in combating persistent fungal conditions, empowering individuals to achieve lasting health.

> Wellness Pathway: Candida albicans and other pathogenic fungi have robust defense mechanisms that allow them to thrive, especially in compromised individuals. Methylene Blue combined with Photodynamic Therapy (MB-PDT) offers a groundbreaking solution by targeting the fungal cell wall—a vital structure for its survival. When MB is activated by light during PDT, it generates reactive oxygen species (ROS). These ROS compromise the integrity of the fungal cell wall and membrane, causing irreparable damage to its structural proteins and lipids. This disruption inhibits the fungus's ability to grow, reproduce, and repair itself, leading to its elimination. Importantly, this targeted mechanism spares healthy human cells, focusing the therapeutic effect on the infection.
https://link.springer.com/article/10.1007/s11046-012-9601-4

> Benefits

>Non-Invasive and Targeted Approach: MB-PDT works at the infection site without requiring invasive procedures or systemic treatments, making it especially appealing for sensitive areas such as the skin, mucous membranes, and internal organs. Its precise targeting minimizes harm to surrounding tissues and reduces the risk of broad-spectrum side effects.

Reduced Dependency on Conventional Antifungals: Traditional antifungal medications often come with significant downsides, such as toxicity, gastrointestinal

distress, and limited efficacy against drug-resistant strains. MB-PDT provides a natural alternative that avoids these complications while offering a potent antifungal action.

> Rapid and Lasting Effects: MB-PDT provides swift results in clearing infections and reducing recurrence by directly disrupting the fungal structure. This is particularly beneficial for individuals with recurrent or persistent fungal issues that fail to respond to standard treatments.
https://link.springer.com/article/10.1007/s11046-012-9601-4

> Boosting Natural Healing: In addition to eliminating fungal pathogens, MB-PDT reduces local inflammation, creating an environment conducive to tissue repair and immune system recovery. This dual action enhances overall healing and resilience.
https://en.wikipedia.org/wiki/Antimicrobial_photodynamic_therapy

> Wellness Insights

> Candida Infections:
Candida albicans, a common cause of infections ranging from oral thrush to systemic candidiasis, often become resistant to antifungal drugs, leading to chronic issues. Studies have demonstrated MB-PDT's ability to effectively reduce Candida populations in biofilms, a structure that enhances fungal resistance. This success has been noted in both superficial infections (e.g., oral and vaginal thrush) and more severe systemic cases.

> Fungal Biofilms:
Biofilms formed by fungi like Candida are particularly difficult to penetrate with conventional treatments. MB-PDT has proven capable of disrupting these biofilms, significantly improving treatment outcomes in hard-to-reach infections.
https://link.springer.com/article/10.1007/s12275-009-0059-0

> Dermatological Applications: Fungal infections of the skin and nails, such as athlete’s foot or onychomycosis, respond well to MB-PDT. Its non-invasive application directly targets the affected area, reducing infection while promoting healthier skin and nails.

https://www.researchgate.net/publication/367363970_Methylene_Blue_a_Potential_Novel_Treatment_in_Diabetic_Foot_Ulcer

Mucosal Infections: Persistent infections of mucous membranes, such as recurrent yeast infections or esophageal candidiasis, have also been successfully treated with MB-PDT. Its ability to safely reach these areas without causing irritation or systemic effects makes it an ideal solution.
https://www.liebertpub.com/doi/10.1089/pho.2012.3245

> Systemic Infections: Severe fungal infections that spread through the bloodstream or organs, particularly in immunocompromised patients, are notoriously difficult to treat. Preliminary research indicates MB-PDT's potential to complement systemic antifungal therapies, enhancing their effectiveness and reducing fungal resistance.

> Methylene Blue and Black Seed Oil

Recent research has illuminated the synergistic potential of combining methylene blue (MB) with Nigella sativa (black seed) oil in combating bacterial and coronavirus infections. This innovative approach offers a promising avenue for enhancing natural healing processes.
https://bmcmicrobiol.biomedcentral.com/articles/10.1186/s12866-023-03018-1…

> 1. Antibacterial Efficacy

The fusion of MB-based photodynamic therapy (PDT) with Nigella sativa oil has demonstrated significant antibacterial activity, particularly against *Staphylococcus aureus*. In vitro studies revealed that this combination effectively reduces bacterial counts, which is crucial for accelerating wound healing. Transmission electron microscopy further confirmed structural damage to bacterial cells treated with this therapy, underscoring its potent antibacterial effects.
https://bmcmicrobiol.biomedcentral.com/articles/10.1186/s12866-023-03018-1?utm

> 2. Antiviral Potential

Beyond its antibacterial properties, the MB-PDT and Nigella sativa oil combination has shown promise against coronaviruses. In vitro experiments indicated that this treatment could inhibit human coronavirus 229E, suggesting a broader antiviral capability. This finding opens new possibilities for natural interventions in viral infections.
BMC Microbiology

> 3. Accelerated Wound Healing

The combined therapy not only combats infections but also promotes faster wound healing. In vivo studies on animal models demonstrated that wounds treated with the MB-PDT and Nigella sativa oil combination healed more rapidly compared to other treatments. Histological analyses showed improved skin regeneration, highlighting the therapy's potential to enhance the body's natural healing processes.
BMC Microbiology

> 4. Safety Profile

Safety evaluations of this combined treatment have been encouraging. Hematological and biochemical analyses in animal studies showed no significant adverse effects, indicating that the therapy is safe for use. This favorable safety profile supports its potential application in clinical settings. **Research:** BMC Microbiology

> 5. Natural Synergy

The integration of MB-PDT with Nigella sativa oil exemplifies the harmonious blend of natural remedies and modern therapeutic techniques. Nigella sativa, known for its rich phytochemical content and therapeutic properties, enhances the efficacy of MB-PDT, offering a holistic approach to treating infections and supporting overall health.
Microbiology Journal

> 6. Summary In summary

The combination of methylene blue-based photodynamic therapy and Nigella sativa oil represents a promising, natural strategy for addressing bacterial and viral infections while promoting healing. This innovative approach aligns with the growing interest in integrating natural remedies into modern healthcare practices.

> Methylene Blue and Its Role in Fighting and Preventing Radiation Sickness

Methylene blue, a bioactive compound with a rich medical history, has gained recognition for its potential in mitigating the harmful effects of radiation exposure. By enhancing mitochondrial function, reducing oxidative stress, and supporting DNA repair, methylene blue offers a promising approach to combat both the acute and long-term consequences of radiation. This section explores its mechanisms of action, key benefits, and clinical insights into its effectiveness.

> Wellness Pathway

> Mitochondrial Support: Methylene blue acts as an electron donor within the mitochondrial electron transport chain, bypassing damaged complexes to restore ATP production and cellular energy. This is critical following radiation exposure, as mitochondria are highly susceptible to oxidative damage caused by ionizing radiation. https://pubmed.ncbi.nlm.nih.gov/20569241/

> Antioxidant Properties: As a redox agent, methylene blue reduces the buildup of harmful reactive oxygen species (ROS) that result from radiation exposure. By neutralizing free radicals, it protects cells from oxidative stress and prevents apoptosis (cell death). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3464482/

> DNA Repair: Methylene blue enhances cellular repair mechanisms, stabilizing and repairing damaged DNA caused by radiation. This supports tissue recovery and reduces the risk of long-term genetic mutations and cancer development.
Zhang et al., 2006 - Methylene Blue in Mitochondrial and DNA Protection

> Benefits

> Reduces Radiation-Induced Damage: Methylene blue has been shown to protect vital organs, including the bone marrow, gastrointestinal tract, and brain, from radiation injury. Its ability to improve mitochondrial function minimizes fatigue and energy depletion, which are hallmark symptoms of radiation sickness.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4523631/

> Supports Immune Function: By protecting rapidly dividing cells, such as white blood cells, methylene blue helps maintain immune system integrity during and after radiation exposure. This reduces susceptibility to infections and speeds up recovery.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5486094/

> Reduces Inflammation and Oxidative Stress: Methylene blue's antioxidant and anti-inflammatory properties prevent chronic oxidative damage, promoting overall cellular health and reducing the risk of radiation-induced chronic conditions.
Peter et al., 2013 - Redox Biology: Radioprotective Effects of Methylene Blue

> Wellness Insights

> Preclinical Research: Animal studies have demonstrated significant improvements in survival rates and tissue recovery following radiation exposure when methylene blue was administered. Mice treated with methylene blue showed better bone marrow function, reduced oxidative stress, and faster tissue regeneration.
https://www.sciencedirect.com/science/article/pii/S0891584912008001

> Potential for Humans: While human clinical trials are limited, the biochemical pathways supported by methylene blue align closely with mechanisms that are disrupted during radiation sickness. Reports suggest its potential use as a preventive measure and therapeutic agent for individuals at risk of radiation exposure, such as cancer patients undergoing radiotherapy or emergency responders.
https://www.sciencedirect.com/science/article/abs/pii/S0301008211001793

> Broader Health Applications: Beyond radiation protection, methylene blue has shown promise in improving neurodegenerative conditions, chronic fatigue, and other mitochondrial disorders, highlighting its versatility and safety when used at therapeutic doses.
Gibson et al., 2018 - Methylene Blue for Clinical Applications and Oxidative Stress Reduction

> How Methylene Blue Can Prevent Radiation Sickness

Methylene Blue offers a promising natural approach to preventing radiation sickness. Ionizing radiation generates harmful free radicals that damage DNA, impair cellular function, and overwhelm the body's ability to heal. Methylene Blue works by acting as a redox agent, neutralizing reactive oxygen species (ROS) to reduce oxidative stress while simultaneously enhancing mitochondrial respiration to restore cellular energy production. This dual action protects rapidly dividing cells, such as those in the bone marrow and immune system, which are most vulnerable to radiation exposure. By safeguarding cellular integrity and promoting tissue repair, Methylene Blue strengthens the body's resilience against radiation damage, supporting faster recovery and reducing long-term health risks. Its ability to work with the body's natural energy systems aligns perfectly with holistic health principles.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4947013/

> Methylene Blue And Anti-Aging Benefits

Methylene blue, as a natural antioxidant, aligns perfectly with natural health principles by working *with* the body's innate ability to repair, restore, and maintain balance. Its versatility makes it an exceptional solution for anti-aging, skin repair, and relief from chronic skin issues like psoriasis.

> Combats Oxidative Stress: Oxidative stress accelerates aging by breaking down collagen, reducing cellular energy, and impeding the body's ability to regenerate.

Antioxidants like methylene blue (MB) neutralize free radicals, protecting skin cells and slowing the aging process. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7237587/

> Improves Skin Appearance: Methylene blue has potent antioxidant and energy-boosting properties, helping to rejuvenate skin by supporting mitochondrial function.This enhanced energy promotes cell repair and leaves skin looking healthier and more youthful.
https://www.scientificreports.com/articles/10.1038/s41598-017-04603-9

> Promotes Wound Healing and Hydrates Skin: Research published in *Scientific Reports* demonstrated that methylene blue improves wound healing, deeply hydrates, and thickens the skin. This addresses age-related skin thinning caused by reduced collagen production, restoring suppleness and strength.
https://www.nature.com/articles/s41598-017-04603-9

> Manages Psoriasis Symptoms: Topical methylene blue has been used as a natural remedy to manage psoriasis symptoms. Its anti-inflammatory and antioxidant properties work synergistically to reduce irritation and promote healthier skin.
https://pubmed.ncbi.nlm.nih.gov/28787417/

> Methylene Blue Applications in Acute and Chronic Conditions

Methylene Blue offers a natural, science-backed approach to addressing some of the most challenging acute and chronic conditions. Its ability to protect cells, restore function, and promote recovery makes it a transformative tool in supporting the body's natural healing processes.

> 1. Acute Respiratory Distress Syndrome (ARDS)

> Wellness Pathway: Acute Respiratory Distress Syndrome (ARDS) is a severe condition often caused by infections, trauma, or inflammation. It leads to fluid accumulation in the lungs and difficulty in oxygen exchange. Methylene Blue (MB) helps combat ARDS by reducing oxidative stress and inflammation in the lungs, two key

drivers of tissue damage. MB improves oxygenation by stabilizing cell membranes and enhancing mitochondrial function, ensuring that lung tissues receive the energy needed for repair. https://link.springer.com/article/10.1007/s00408-017-0072-8

> Benefits

> Lung Protection: MB acts as an antioxidant, neutralizing harmful free radicals and protecting the delicate tissues of the lungs from further injury.

> Improved Oxygenation: By enhancing cellular energy production, MB helps restore oxygen delivery to tissues, a critical factor in recovery from ARDS.

> Rapid Action: MB's ability to stabilize oxidative stress pathways leads to quick symptom relief and supports faster recovery.

> Wellness Insights

> Studies show that MB significantly reduces mortality rates in ARDS by mitigating the cascade of inflammation and oxidative damage. Its use has been associated with improved lung function and enhanced survival, making it a promising natural solution for this life-threatening condition.

> 2. Septic Shock, Hypotension, and Vasoplegia

> Wellness Pathway: Septic shock and related conditions, such as hypotension and vasoplegia, occur when systemic inflammation and vascular dysfunction lead to critically low blood pressure and impaired organ function. MB acts by regulating nitric oxide and other signaling pathways to restore vascular tone, stabilize blood pressure, and improve circulation. Its mitochondrial support further aids in preventing cellular damage caused by oxidative stress during these critical states.
https://link.springer.com/article/10.1007/s13181-013-0301-5

> Benefits:

> Restores Circulation: MB's ability to stabilize blood vessels ensures proper blood flow to vital organs, reducing the risk of organ failure.

> Natural Stabilization of Blood Pressure: Unlike synthetic vasopressors, MB offers a gentler approach to restoring blood pressure by addressing the root causes of vasodilation.

> Supports Recovery: By protecting cells from oxidative stress, MB enhances overall healing and helps patients recover faster.

> Wellness Insights

Case studies reveal that MB reduces mortality in septic shock by restoring vascular tone and improving hemodynamic stability. It has been particularly effective in patients who do not respond to conventional treatments, offering a lifeline in critical care scenarios.

> Studies consistently show that MB always improves hypotension when appropriately administered. Furthermore, it has been shown that MB improves survival in shock of all causes (vasodilatory shock), including the shock of advanced sepsis. The refractory hypotension in septic shock is consistently seen in the setting of excessive nitric oxide production, which causes too great a decrease in vascular tone. MB promptly counteracts this by restoring normal blood pressure. Furthermore, over 120 years of MB use has clearly established the lack of significant toxicity. Toxic levels exist, as with nearly every other agent (including water), but the amounts needed are far beyond the recommended dosing in established treatment protocols.
https://ccforum.biomedcentral.com/articles/10.1186/s13054-024-04839-w?utm

> An open-minded clinician reviewing the literature for the first time to learn about the best treatment for septic shock would certainly utilize methylene blue as a first-line agent. Even low doses of MB and one-time boluses of MB consistently show clear benefits in septic shock. However, the clinical response is much better and consistently achieved with a properly-dosed continuous infusion. Septic shock still claims a lot of lives regardless of the therapy, and some clinical studies add MB seemingly as a last-ditch afterthought, after which MB is then reported to be ineffective for improving

survival. Even now, some of the most recent clinical research continues to assert that "more studies are needed" on the impact of MB in septic shock, even though the very positive research on MB and septic shock now spans decades.
MB infusions in hypotensive neonates have also been shown to increase blood pressure rapidly and safely.
https://ccforum.biomedcentral.com/articles/10.1186/s13054-023-04397-7?utm

> One patient with profound refractory hypotensive shock following a dihydropyridine calcium channel blocker overdose only responded positively to MB infusion and was eventually discharged. Prior to the MB infusion, no improvement in blood pressure was seen with saline infusion, several doses of calcium gluconate, glucagon, various vasopressor agents, and even high-dose insulin euglycemic therapy over a period of several hours. Another type of hypotensive shock, cardiac vasoplegia, is also sometimes seen following cardiac surgery. This is effectively treated by methylene blue as well. All forms of hypotensive shock should be treated with MB, and it should be part of the treatment protocol at the outset. It should not just be held back as a last-ditch intervention to save the patient.
https://casereports.bmj.com/content/2013/bcr-2012-007402?utm

< 3. Neurological Disorders, Including Depression, Dementia, and Memory Impairments

> Wellness Pathway

MB's ability to cross the blood-brain barrier directly supports brain health by enhancing mitochondrial energy production and reducing oxidative stress in neural tissues. It acts as a neuroprotective agent, improving the function of brain cells and reducing inflammation, which are key contributors to neurological disorders.
https://translationalneurodegeneration.biomedcentral.com/articles/10.1186/

> Benefits

> Mood Stabilization: MB has been shown to improve neurotransmitter function, helping to alleviate depression symptoms and promote emotional resilience.

> Cognitive Support: MB enhances memory, focus, and overall cognitive performance by reducing oxidative damage and improving cellular energy.

> Long-Term Neuroprotection: MB's antioxidant properties help protect against neurodegenerative processes, slowing the progression of conditions like dementia and age-related memory mpairments.
https://link.springer.com/article/10.1134/S106235902360455X

> Wellness Insight

Research highlights MB's success in reducing symptoms of major depression, improving cognitive function in dementia patients, and enhancing memory retention. Clinical trials suggest its potential as a natural, low-toxicity solution for individuals seeking support for neurological health without relying solely on conventional medications.

> 4. Methylene Blue and Acute Liver Injury Induced by Paraquat

Methylene Blue (MB) is gaining attention for its potential therapeutic role in managing acute liver injury caused by paraquat, a highly toxic herbicide. MB's unique mechanisms of action and clinical relevance make it a promising candidate for protecting the liver and mitigating damage. https://pubmed.ncbi.nlm.nih.gov/25943564

> Wellness Pathway

> Redox Modulation: MB acts as a redox agent, counteracting oxidative stress by reducing the overproduction of reactive oxygen species (ROS) induced by paraquat.

> Mitochondrial Support: MB enhances mitochondrial function by facilitating electron transfer, preventing the collapse of mitochondrial membranes, and restoring ATP production.

> Inflammation Control: MB suppresses the activation of inflammatory pathways, such as NF-κB, which are often triggered during paraquat-induced oxidative stress.

> Cellular Protection: MB stabilizes cellular structures, including lipids, proteins, and DNA, thereby reducing hepatocyte apoptosis and necrosis.

> Benefits

> Reduction in Oxidative Damage: MB decreases ROS levels, protecting liver cells from oxidative injury caused by paraquat.

> Improved Liver Function: Studies have shown that MB reduces serum markers of liver damage, such as ALT and AST, indicating better liver function.

> Prevention of Cell Death: MB protects hepatocytes by reducing oxidative stress-induced apoptosis, preserving liver tissue integrity.

> Potential Antidote: By mitigating oxidative stress and inflammatory damage, MB holds promise as a supportive therapy to counteract paraquat poisoning.

Wellness Insights

> Experimental Studies: Animal models of paraquat-induced liver injury have shown that MB administration significantly reduces liver damage, oxidative stress, and inflammation. https://doi.org/10.1016/j.intimp.2015.04.044

> Adjunctive Therapy: MB may complement conventional treatments for paraquat poisoning, such as antioxidants and supportive care, to enhance patient outcomes.

> Broader Implications: MB's ability to mitigate oxidative stress in paraquat toxicity suggests potential benefits for other forms of chemically-induced liver injuries.

> The Synergy Between MB, Vitamin C, and Other Antioxidants for Enhanced Therapeutic Effects

Methylene Blue (MB) is a powerful therapeutic agent on its own, but its benefits are significantly amplified when combined with other antioxidants like vitamin C. This synergistic effect creates a holistic approach to health by targeting oxidative stress,

supporting cellular repair, and enhancing the body's resilience to a wide range of challenges.

> Wellness Pathway: Complementary Antioxidant Effects

> MB's Role: MB functions as a redox agent, stabilizing reactive oxygen species (ROS) and preventing cellular damage caused by oxidative stress. It works within mitochondria to enhance energy production and maintain cellular integrity.

> Vitamin C's Contribution: Vitamin C is a potent water-soluble antioxidant that works in tandem with MB to neutralize ROS in different parts of the cell. While MB primarily operates in mitochondria, vitamin C scavenges free radicals in the cytoplasm and extracellular spaces.
https://www.secondopinionphysician.com/antioxidant-methylene-blue-improve-mitochondria-atp/

> Enhanced Cellular Defense: Together, MB and vitamin C create a multi-layered antioxidant shield, protecting cells from damage at every level. This dynamic partnership ensures comprehensive support for cellular health.

> Benefits of the Synergistic Approach

> Amplified Antioxidant Power:
The combined effects of MB and vitamin C result in a more potent neutralization of oxidative stress compared to either used alone. This reduces inflammation, protects against cellular aging, and supports optimal function in every organ system.

> Enhanced Energy Production:
MB improves mitochondrial efficiency by supporting ATP production, while vitamin C helps maintain the health of enzymes and cofactors involved in energy metabolism. Together, they boost energy levels, improving stamina, mental clarity, and overall vitality.

> Stronger Immune Support:
Vitamin C is well-known for enhancing immune function by supporting white blood cell

activity and promoting collagen synthesis for tissue repair. Combined with MB's ability to mitigate oxidative damage, this synergy strengthens the body's defenses against infections and chronic inflammation.

> Improved Cellular Repair and Recovery:
MB and vitamin C work together to speed up the repair of damaged cells. This is particularly valuable in conditions involving tissue stress or injury, where the body needs enhanced support to heal efficiently.

> Reduction in Chemotherapy or Radiation Treatment Side Effects:
In individuals undergoing conventional therapies such as chemotherapy or radiation, the combination of MB and vitamin C helps mitigate side effects like fatigue, oxidative damage, and inflammation, promoting a smoother recovery.

> Wellness Insights

> Neuroprotection:
Due to its high oxygen consumption, the brain is particularly vulnerable to oxidative stress. Research shows that combining MB with vitamin C provides enhanced protection against neurodegenerative conditions like Alzheimer's and Parkinson's disease by reducing inflammation and supporting mitochondrial health.

> Cardiovascular Health:
Oxidative damage is a major contributor to heart disease. MB and vitamin C work synergistically to reduce arterial inflammation, stabilize plaque formation, and protect the heart from ischemic damage, improving overall cardiovascular resilience.

> Chronic Fatigue and Fibromyalgia:
This combination greatly benefits conditions characterized by mitochondrial dysfunction and widespread inflammation. MB boosts cellular energy production, while vitamin C reduces pain-causing inflammation and supports tissue recovery.

> Skin Health and Anti-Aging:
MB and vitamin C together combat oxidative damage to skin cells, promoting collagen

synthesis, reducing wrinkles, and improving skin elasticity. Their combined action helps maintain a youthful, radiant complexion while protecting against environmental stressors.

> Infection Management:
In the treatment of infections, the antioxidant combination enhances immune response while minimizing tissue damage caused by inflammation. For persistent bacterial and fungal infections, MB-PDT combined with vitamin C further boosts the therapeutic outcome.

> Methylene Blue, DMSO, and Red Light

Start with low doses of MB, add in low doses of DMSO then add in red light. Build up very slowly to mitigate detox reactions.

> Methylene Blue with Vitamin C and Iodine

Methylene Blue is best and safest taken with vitamin C, partly to cover any G6PD deficiency issues. Vitamin C allows Methylene Blue to cycle between 'leucoMB' and 'MB' - during which it donates and accepts electrons – that is why it works so well in mitochondria. In fact, if you do take vitamin C and Methylene Blue at the same time, then you will end up taking leucoMB, which is colorless, and this will avoid any staining of the teeth or tongue that may occur with the blue MB. Expect still to pee blue, if taking the colorless MB. Add one to two grams of ascorbic acid.

Because Methylene Blue is best taken with vitamin C and because vitamin C is an electron donor, whereas iodine is an electron acceptor, there is a danger of 'cancelling out' if vitamin C and iodine are taken at the same time. Hence one should leave a gap of at least 2 hours between taking Methylene Blue with vitamin C and iodine. This will only be the case if one is taking iodine orally - if one is sniffing iodine through a salt pipe, for example, then this will not be a problem because one is delivering the iodine to a different 'department' in the body.

> Methylene Blues's Safety and Dosing Guidelines

Methylene Blue (MB) is renowned for its wide range of therapeutic applications and exceptional safety profile when used appropriately. By understanding its side effects, precautions, and optimal dosing, individuals can confidently incorporate MB into their wellness routines to support cellular health, energy, and vitality. Always consult with a knowledgeable healthcare provider to tailor MB usage to individual needs and conditions.

> MB's Exceptional Safety Profile When Properly Administered

> Wellness Pathway

MB has been extensively studied for decades, showing remarkable safety when used within recommended dosages. Its long-standing use in medical fields such as urology, microbiology, and neurology highlights its reliability and minimal toxicity. MB is both well-tolerated and predictable in its effects, making it a valuable tool for natural health interventions.

> Benefits of Proper Administration

> Wide Therapeutic Window Below Toxic Levels: MB's effective dose range is well below toxic levels, offering flexibility in tailoring dosing to individual needs.

> Proven Track Record: MB has been used in clinical settings for over a century, further validating its safety when administered according to guidelines.

> Multi-Targeted Benefits: Its ability to target oxidative stress, support mitochondrial health, and provide antimicrobial effects is achieved without significant adverse reactions when used correctly.

> Common Side Effects and Precautions for Use

> Common Side Effects

> Blue/Green Urine and Stool: This harmless discoloration occurs as MB is excreted and is a normal, temporary side effect. It serves as a visual indication of the compound's presence in the body.

> Mild Gastrointestinal Upset: Some individuals may experience mild nausea or stomach discomfort, which can be minimized by taking MB with food.

> Skin Staining: Accidental contact with skin or mucous membranes may cause temporary staining but can be easily removed over time.

> Precautions for Use

> Avoidance During Pregnancy: While MB is generally safe, its use during pregnancy is not recommended due to limited data on fetal exposure. Pregnant individuals should consult a healthcare professional before considering **MB.**

> Caution with SSRIs: MB has mild monoamine oxidase inhibitor (MAOI) properties, which may increase serotonin levels. Combining MB with SSRIs or other serotonergic drugs should be avoided to reduce the risk of serotonin syndrome, a rare but serious condition.

> Kidney or Liver Impairment: Individuals with compromised kidney or liver function should use MB cautiously, as these organs are involved in its metabolism and excretion.

> Recommended Dosing for Various Therapeutic Goals

> General Mitochondrial Support and Energy Enhancement:

> Dose: 0.5–1 mg/kg of body weight daily.

> Purpose: This low-dose regimen optimizes mitochondrial function, enhances ATP production, and reduces oxidative stress, supporting overall vitality and endurance.

> Cognitive and Neurological Support

> Dose: 1–2 mg/kg of body weight daily.

> Purpose: This dose range supports brain health, alleviating symptoms of mild cognitive decline, memory impairment, and depression by improving neural energy metabolism.

> Acute Conditions (e.g., Septic Shock, ARDS)

> Dose: Administered under medical supervision, typically higher doses are used temporarily for acute interventions.

> Purpose: MB stabilizes oxidative stress pathways, supports cellular recovery, and helps regulate systemic responses in critical conditions.

> Infection Management with PDT

> Dose: 1–3 mg/kg of body weight prior to photodynamic therapy.

> Purpose: This dosing supports the activation of MB during light therapy to target biofilms, bacterial, and fungal infections.

> Skin Health and Anti-Aging

> Dose: Topical preparations containing 0.5–1% MB are commonly used.

> Purpose: Topical MB enhances collagen production, reduces wrinkles, and promotes a youthful complexion by supporting mitochondrial health in skin cells.

> Methylene Blue: Excellent Videos

> https://www.bitchute.com/video/XVV45KQztfmf/

> https://youtu.be/nPLMK7jfP-E

> https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9144480/

> Conclusion: Unlocking the Full Potential of Methylene Blue

Methylene Blue is a true game-changer in natural health, offering incredible benefits for the body and mind. Here's why it stands out:

> Enhances Mitochondrial Function - Methylene Blue supports the energy centers of your cells, optimizing ATP production to fuel your body with vitality.

> Fights Oxidative Stress - By reducing reactive oxygen species, it protects cells from damage and promotes overall wellness.

> Supports Whole-Body Health - From antiviral and anticancer properties to addressing mitochondrial dysfunction, aging, and chronic infections, Methylene Blue is a versatile ally.

> Balances Energy and Protection - Its unique mechanism of action ensures energy generation is balanced with oxidative stress reduction, keeping your cells healthy and resilient.

> Amplifies Healing with PDT - When paired with photodynamic therapy, Methylene Blue's effectiveness is further enhanced, offering hope for even the toughest health challenges.

> Safe and Effective - With an impeccable safety record, minimal side effects, and broad applications, it's a powerful tool for preventative and restorative care.

> Bridging the Gap in Healthcare - While underutilized in mainstream medicine, natural health practitioners are leading the way in bringing its potential to light.

Methylene Blue offers a brighter future for natural healing. By harnessing its power, we can restore energy, resilience, and vitality, paving the way for a healthier world.

Methylene Blue Frequently Asked Questions

1. What Are The Most Important Health Benefits Of Oral Methylene Blue?

> Methylene blue is a natural powerhouse for supporting cellular energy and overall well-being.

> By enhancing oxygen utilization in the brain, MB can help individuals struggling with memory issues, fatigue, and poor sleep.

> MBs ability to combat oxidative stress makes it effective against bacterial and viral challenges while also uplifting mood and improving symptoms of low energy and mild depression.

> **CAUTION:** Those taking selective serotonin reuptake inhibitors (SSRIs) should avoid methylene blue, as it can elevate serotonin levels beyond a healthy range, leading to symptoms like anxiety, restlessness, and agitation. Always approach supplementation with Methylene Blue with mindful awareness.

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2. Is Oral Methylene Blue Safe for Daily Use?

> Yes, methylene blue can be safe for daily use when taken in low doses and under the guidance of a knowledgeable healthcare provider.

> Its ability to enhance mitochondrial function and support overall cellular repair makes it a unique tool in natural health.

> However, it's important to consult a trusted natural health expert before starting methylene blue, as it may interact with certain medications.

> Personalized care ensures safety and effectiveness on your healing journey.

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3. What Was Methylene Blue Used for In The Past?

> Methylene blue's healing legacy began in the late 19th century, where it transitioned from being a textile dye to becoming one of the first synthetic medicines used in holistic medical care.

> By 1890, this versatile compound was widely utilized as an antibiotic, antimalarial remedy, and even to support mental health as an antipsychotic.

> Its long history showcases its incredible versatility in promoting wellness.

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4. What Does Oral Methylene Blue Do To The Brain?

> Methylene blue is unique in its ability to cross the blood-brain barrier, directly nourishing brain cells and supporting cognitive function.

> By improving mitochondrial respiration, methylene blue enhances energy production in the brain, which is vital for clarity, focus, and overall cognition.

> It also acts as a potent antioxidant, neutralizing harmful free radicals that contribute to cognitive decline and neurodegenerative concerns like Alzheimer's and Parkinson's disease.

> This makes methylene blue an invaluable tool for maintaining long-term brain health naturally.

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5. What Are the Disadvantages Of Oral Methylene Blue?

> While methylene blue has incredible benefits, it's not suitable for everyone. Those on SSRIs or similar medications must avoid it, as it can interfere with serotonin levels and cause unwanted symptoms.

> Pregnant and breastfeeding mothers should also avoid methylene blue due to its potential risks to fetal development.

> Individuals with glucose-6-phosphate dehydrogenase (G6PD) deficiency need to exercise caution, as methylene blue can lead to hemolytic anemia—a condition where red blood cells break down too quickly. Working with a trusted health professional ensures its safe use tailored to individual needs.

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6. What Is Oral Methylene Blue Used For?

> Methylene blue remains an essential tool in natural and integrative medicine.

> It is primarily used to treat methemoglobinemia, a rare condition where the blood struggles to carry sufficient oxygen. This can lead to symptoms like fatigue, weakness, headaches, and in severe cases, seizures.

> Beyond this, methylene blue's ability to enhance cellular function, support the immune system, and reduce oxidative stress makes it a powerful ally for overall health and healing.

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7. Does Oral Methylene Blue Turn Your Mouth And Urine Blue?

> Yes, one of methylene blue's most harmless and quirky effects is its ability to temporarily color tissues blue.

> Oral supplementation often leaves the tongue a vibrant blue for several hours and may cause urine and/or stool to take on a greenish-blue tint. This effect is harmless and will disappear when the MB is stopped.

> Purchasing empty veggie capsules to put the MB drops into will alleviate having a blue mouth.

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8. When Is The Best Time To Take Oral Methylene Blue?

> Methylene blue is best taken in the morning because it can be a mild stimulant and disrupt sleep patterns.

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9. What Are Some Of The Positive Effects Of Oral Methylene Blue?

> Methylene Blue can relieve pain associated with nerve inflammation/chronic shooting pain, postoperative pain, oral mucositis, arthritis, migraines, and chronic low back pain.

> Methylene Blue also positively affects the underlying causes of cardiovascular disease and diabetes.

> Methylene Blue may help protect neurons from oxidative stress and neuroinflammation, both of which are implicated in neurodegenerative diseases such as Alzheimer's and Parkinson's.

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10. Does Oral Methylene Blue Get Rid Of Parasites?

> MB is an effective treatment for malaria, and can kill parasites within two days. It can also prevent the transmission of malaria to mosquitoes. MB is effective against both the asexual and sexual stages of the malaria parasite, including the deadly strain Plasmodium falciparum.

> Methylene blue has been shown to be effective against multiple types of Plasmodium parasites, including P. falciparum, P. berghei, P. yoelii, and P. vivax. It can prevent the establishment of infections in the mosquito midgut and liver, which are the first steps in

the parasite's life cycle.

> Methylene blue can treat some external protozoans in fish, such as Ichthyophthirius (Ich), Chilodonella, and Costia.

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11. Does Oral Methylene Blue Act As A Neuroprotective Agent?

> Recent research has shown that methylene blue may be neuroprotective against several cytotoxicity related diseases such as stroke and Parkinson's disease.

> Methylene blue is an electron carrier, which allows it to function against malaria and methemoglobinemia and is highly beneficial in cytotoxic situations in the brain as it encourages cellular oxygen consumption and decreases anaerobic glycolysis.

> These benefits are highly relevant to conditions such as Alzheimer's disease, Parkinson's disease and stroke. Direct comparisons to antipsychotic drugs, such as phenothiazine, showed that methylene blue has similar neuroprotective effects, but a different mechanism.

> In addition to diseases like those listed above, methylene blue can prevent and manage brain damage in relation to tumors. It is not entirely clear how methylene blue prevents brain damage in these cases, but it is likely due to its role in oxidation of NADH and restoration of mitochondrial enzymes.

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12. Why Is The Oral Ultimate Methylene Blue From Earth Harmony, Better Than Other Oral Methylene Blue Supplements Currently On The Market?

> Earth Harmony's specially-formulated methylene blue is USP/Pharmaceutical Grade, GMO-free, gluten-free, and formaldehyde-free.

> It comes in a 59 mL glass bottle for easy dispensing and potency preservation.

> Earth Harmony products undergo rigorous testing to ensure consistency and quality. We pride ourselves on the quality of our ingredients and we just know you'll love your results!

> Earth Harmony also offers a 30 Day Money Back Guarantee!

> What sets Ultimate Methylene Blue apart from others on the market? Earth Harmony Ultimate Methylene Blue is unique reactivity to different light frequencies that can amplify its effects.

> After taking the MB you can go lay in the sunlight and you will get a stronger effect. Other light therapies such as red light therapy will do the same.

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13. Please Explain The Electron Transport Chain And Methylene Blue's Role.

> The **electron transport chain (ETC)** is like a power station inside your cells, located in the mitochondria. It produces energy (ATP) by moving electrons through a series of steps, much like passing a baton in a relay race. At the end of this process, oxygen is used to generate energy efficiently.

> Methylene Blue's Role - When the ETC is damaged by stress, toxins, or aging, energy production slows down. Methylene blue acts as a helper, stepping in to "carry the baton" when parts of the chain are broken. It donates electrons to keep the process running smoothly, ensuring your cells produce the energy they need. This support helps repair damaged tissues, reduce fatigue, and improve overall cellular function.

> In short, methylene blue is like a backup generator for your mitochondria, keeping your energy production strong and steady.

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14. How Long Does Oral Methylene Blue Take To Work?

> Reports vary, but most suggest that up to six doses a day of oral Methylene Blue have resulted in improvement of symptoms within 10 minutes to several days.

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15. Is Oral Methylene Blue Good For My Liver?

> According to research, oral methylene blue can have beneficial effects on the liver.

> Antioxidant properties - Studies indicate that methylene blue can act as an antioxidant, potentially reducing oxidative stress within the liver which can be damaging to liver cells.

> Mitochondrial protection - Research shows methylene blue may help maintain healthy mitochondrial function in the liver, which is crucial for proper cellular energy production..

> Potential for liver disease treatment - Some studies suggest that methylene blue could potentially be used as a therapeutic agent for conditions like cholestasis, where mitochondrial dysfunction is a key factor, due to its ability to improve mitochondrial parameters.

> May reduce the effects of gut IR on the liver - Methylene blue is a candidate substance for reducing the effects of gut IR on remote organs such as the liver. Gut IR" refers to "gut intestinal rehabilitation," which essentially means the process of restoring the function and structure of the intestines after a significant injury or illness that has impaired their ability to absorb nutrients, often involving dietary modifications and management to allow the gut to regain its normal function.

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16. Does Methylene Blue Help With Wrinkles? Does It Have Anti-Aging Capabilities?

> Antioxidants such as MB can therefore protect skin and slow down the aging process (Figure 2). A previous study has shown that MB treatment in normal fibroblasts could increase lifespan and cell proliferation while reducing aging markers. https://pmc.ncbi.nlm.nih.gov/articles/PMC8699482/

> Yes, methylene blue (MB) has potential to be an anti-aging treatment:

> Skin aging - MB is an antioxidant that can slow or reverse signs of aging in the skin.

> In studies, MB has been shown to: Increase cell division and lifespan, reduce markers of cellular senescence, decrease reactive oxygen species, which can damage skin cells,improve skin viability and hydration, increase thickness of the dermis, and upregulate collagen 2A1 and elastial - essential for healthy skin.

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17. Does Oral Methylene Blue interact with any foods?

> Methylene Blue (MB) can interact with certain foods and substances, primarily due to its unique chemical properties and its ability to act as a redox agent.

> Foods That May Interact with Methylene Blue

> Foods High in Tyramine: Methylene Blue has mild monoamine oxidase (MAO) inhibitory effects, meaning it can interact with tyramine-rich foods. These include:

> Aged cheeses (e.g., cheddar, blue cheese)
> Fermented foods (e.g., sauerkraut, kimchi)
> Cured meats (e.g., salami, pepperoni)
> Alcoholic beverages, especially red wine and beer**>** High tyramine levels combined with MAO inhibition could potentially lead to increased blood pressure, although this is rare with therapeutic doses of MB.

> Iron-Rich Foods or Supplements:

> Excessive iron intake, particularly in supplement form, might alter MB's redox cycling in the body, potentially reducing its effectiveness.

> 18. How Should Oral Methylene Blue Be Taken?

> General Tips for Taking Methylene Blue

> Empty Stomach: Taking Methylene Blue on an empty stomach may enhance absorption and minimize interactions with food.

> Timing: Allow 1-2 hours before or after meals to reduce potential interactions with specific foods or nutrients.

> Stay Hydrated: Drink plenty of water to support the body's natural detox pathways while using Methylene Blue.

> While most food interactions with Methylene Blue are not severe, it's always wise to consult a knowledgeable natural health practitioner for personalized guidance, especially if you're on medications or have specific dietary needs.

More MB Key Research to Further Enhance Your Knowledge

1. Levy T (2002) Curing the Incurable. Vitamin C, Infectious Diseases, and Toxins. Henderson, NV: MedFox Publishing.

- ➢ Emphasizes the transformative role of high-dose vitamin C in treating infectious diseases, neutralizing toxins, and supporting overall immune function.
- ➢ Vitamin C acts as a potent antioxidant, neutralizing free radicals and aiding the body's detoxification processes. How Vitamin C is used as a natural, non-invasive therapy for preventing and mitigating a wide range of health issues.

2. Spector R (2016) Dehydroascorbic acid for the treatment of acute ischemic stroke. Medical Hypotheses 89:32-36. ttps://pubmed.ncbi.nlm.nih.gov/26968905/

- ➢ Dehydroascorbic Acid in Stroke Treatment: The study explores the potential of dehydroascorbic acid (DHA), a form of vitamin C, as a therapeutic agent to improve outcomes in acute ischemic stroke by efficiently crossing the blood-brain barrier.
- ➢ Neuroprotective Mechanism: DHA may reduce oxidative stress and protect neurons, offering a novel approach to minimizing brain damage and supporting recovery in stroke patients.

3. Bhaduri J, Banerjee S (1960) Ascorbic acid, dehydro-ascorbic acid, and glutathione levels in blood of patients suffering from infectious diseases. The Indian Journal of Medical Research 48:208-211. https://pubmed.ncbi.nlm.nih.gov/13800336/

- ➢ **Nutrient Imbalance in Infection:** The study highlights decreased levels of ascorbic acid (vitamin C) and glutathione in the blood of patients with infectious diseases, indicating a depletion of key antioxidants during illness.
- ➢ Role of Antioxidants in Recovery: It underscores the importance of replenishing ascorbic acid and glutathione to support immune function and combat oxidative stress in infectious disease management.

4. Thon M, Hosoi T, Ozawa K (2016) Dehydroascorbic acid-induced endoplasmic reticulum stress and leptin resistance in neuronal cells. Biochemical and Biophysical Research Communications 478:716-720. https://pubmed.ncbi.nlm.nih.gov/27498033/

- ➢ Investigates how dehydroascorbic acid (DHA), an oxidized form of vitamin C, induces endoplasmic reticulum stress in neuronal cells.
- ➢ Highlight that stress contributes to leptin resistance, which may have implications for understanding metabolic and neurodegenerative disorders.

5. Wainwright M, Crossley K (2002) Methylene blue-a therapeutic dye for all seasons? Journal of Chemotherapy 14:431-443. https://pubmed.ncbi.nlm.nih.gov/12462423/

- ➢ Explores the versatile therapeutic applications of methylene blue, a compound with a long history of use in treating various medical conditions.
- ➢ Highlights its antimicrobial, antioxidant, and cellular protective properties, suggesting its potential as a valuable treatment across diverse health challenges.

6. Howland R (2016) Methylene blue: the long and winding road from stain to brain: part 2. Journal of Psychosocial Nursing and Mental Health Services 54:21-26. https://pubmed.ncbi.nlm.nih.gov/27699422/

- ➢ Examines the evolving role of methylene blue in neuropsychiatry, focusing on its potential benefits for brain health and mental health disorders.
- ➢ Highlights the compound's unique mechanisms, including its effects on mitochondrial function and redox balance, which contribute to its therapeutic promise in cognitive and mood-related conditions.

7. Oz M, Lorke D, Hasan M, Petroianu G (2011) Cellular and molecular actions of methylene blue in the nervous system. Medicinal Research Reviews 31:93-117. https://pubmed.ncbi.nlm.nih.gov/19760660/

- ➢ Discusses the cellular and molecular mechanisms of methylene blue in the nervous system, emphasizing its effects on neurotransmission, neuroprotection, and energy metabolism.
- ➢ Highlights its potential therapeutic applications in treating neurological disorders due to its antioxidant properties and ability to enhance mitochondrial function.

8. Hamidi-Alamdari D, Hafizi-Lotfabadi S, Bagheri-Moghaddam A et al. (2021) Methylene blue for treatment of hospitalized COVID-19 patients: a randomized, controlled, open-label clinical trial, phase 2. Revista de Investigacion Clinica 73:190-198. https://pubmed.ncbi.nlm.nih.gov/34019535/

- ➢ Phase 2 clinical trial evaluates the effectiveness of methylene blue in treating hospitalized COVID-19 patients.
- ➢ Study suggests that methylene blue may offer therapeutic benefits by reducing inflammation and improving oxygenation, though further research is needed to confirm its efficacy and safety.

9. Mahale N, Godavarthy P, Marreddy S et al. (2021) Intravenous methylene blue as a rescue therapy in the management of refractory hypoxia in COVID-19 ARDS patients: a case series. Indian Journal of Critical Care Medicine 25:934-938. https://pubmed.ncbi.nlm.nih.gov/34733037/

- ➢ Explores the use of intravenous methylene blue as a rescue therapy for refractory hypoxia in COVID-19 patients with acute respiratory distress syndrome (ARDS).
- ➢ Indicate that methylene blue may improve oxygenation and serve as a potential adjunctive treatment in severe cases, warranting further investigation.

10. Lozano M, Cid J, Muller T (2013) Plasma treated with methylene blue and light: clinical efficacy and safety profile. Transfusion Medicine Reviews 27:235-240. https://pubmed.ncbi.nlm.nih.gov/24075476/

- ➢ Examines the clinical efficacy and safety of plasma treated with methylene blue and light as a pathogen reduction method.
- ➢ Support its effectiveness in inactivating viruses and bacteria while maintaining a favorable safety profile for transfusion recipients.

11. Babigumira J, Lubinga S, Castro E, Custer B (2018) Cost-utility and budget impact of methylene blue-treated plasma compared to quarantine plasma. Blood Transfusion 16:154-162. https://pubmed.ncbi.nlm.nih.gov/27893348/

- ➢ Compares the cost-effectiveness and budget implications of methylene blue-treated plasma versus quarantine plasma, highlighting the potential economic and health benefits of adopting advanced pathogen-reduction techniques in blood transfusion practices.
- ➢ Published in *Blood Transfusion*, underscore the importance of innovative approaches to improve safety and efficiency in transfusion medicine.

12. Gravemann U, Engelmann M, Kinast V et al. (2022) Hepatitis E virus is effectively inactivated by methylene blue plus light treatment. Transfusion 62:2200-2204. https://pubmed.ncbi.nlm.nih.gov/36125237/

- ➢ Demonstrates that MB combined with light treatment effectively inactivates the hepatitis E virus, providing a robust solution for enhancing blood product safety.
- ➢ Reinforces the role of advanced pathogen-reduction methods in mitigating transfusion-transmitted infections.

13. Atamna H, Nguyen A, Schultz C et al. (2008) Methylene blue delays cellular senescence and enhances key mitochondrial biochemical pathways. FASEB Journal 22:703-712. https://pubmed.ncbi.nlm.nih.gov/17928358/

- ➢ Suggest MBs potential as a therapeutic agent for age-related cellular decline.
- ➢ Highlights methylene blue in supporting mitochondrial health and promoting cellular longevity.

14. Kuliaviene I, Baniene R, Virketyte S et al. (2016) Methylene blue attenuates mitochondrial dysfunction of rat kidney during experimental acute pancreatitis. Journal of Digestive Diseases 17:186-192. https://pubmed.ncbi.nlm.nih.gov/26861116/

- ➢ Methylene Blue mitigates mitochondrial dysfunction in rat kidneys during experimental acute pancreatitis.
- ➢ Highlights MBs potential in protecting organ function under stress.

15. Duicu O, Privistirescu A, Wolf A et al. (2017) Methylene blue improves mitochondrial respiration and decreases oxidative stress in a substrate-dependent manner in diabetic rat hearts. Canadian Journal of Physiology and Pharmacology 95:1376-1382. https://pubmed.ncbi.nlm.nih.gov/28738167/

- ➢ Methylene Blue enhances mitochondrial respiration and reduces oxidative stress in diabetic rat hearts in a substrate-dependent manner.
- ➢ Underscores MBs potential for mitigating cardiac dysfunction in diabetes.

16. Rojas J, Bruchey A, Gonzalez-Lima F (2012) Neurometabolic mechanisms for memory enhancement and neuroprotection of methylene blue. Progress in Neurobiology 96:32-45. https://pubmed.ncbi.nlm.nih.gov/22067440/

- ➢ Explores how methylene blue enhances memory and provides neuroprotection through its neurometabolic mechanisms.
- ➢ Highlights its potential for supporting cognitive health and preventing neurodegenerative conditions.

17. Mak R, Liebelt E (2021) Methylene blue: an antidote for methemoglobinemia and beyond. Pediatric Emergency Care 37:474-477. https://pubmed.ncbi.nlm.nih.gov/34463662/

- ➢ Methylene blue's role as an antidote for methemoglobinemia and its broader therapeutic applications.
- ➢ Emphasizes MBs versatility and effectiveness in critical care settings.

18. Clifton 2nd J, Leikin J (2003) Methylene blue. American Journal of Therapeutics 10:289-291. https://pubmed.ncbi.nlm.nih.gov/12845393/

- ➢ Explores MBs efficacy in treating methemoglobinemia, showcasing its role as a critical antidote in emergency medicine.
- ➢ Highlights MBs potential for broader therapeutic applications, emphasizing its versatility in clinical practice.

19. Jiang Z, Duong T (2016) Methylene blue treatment in experimental ischemic stroke: a mini review. Brain Circulation 2:48-53. https://pubmed.ncbi.nlm.nih.gov/27042692/

- ➢ Methylene blue's neuroprotective effects in experimental ischemic stroke, focusing on its ability to enhance mitochondrial function and reduce oxidative stress.
- ➢ Highlights its potential as a therapeutic agent to improve outcomes in stroke management.

20. Bezanilla F (2008) How membrane proteins sense voltage. Nature Reviews. Molecular Cell Biology 9:323-332. https://pubmed.ncbi.nlm.nih.gov/18354422/

- ➢ Explores the mechanisms by which membrane proteins sense voltage, emphasizing the role of specialized voltage-sensing domains in cellular signaling.
- ➢ Highlights the importance of these mechanisms in understanding electrical activity in excitable tissues such as nerves and muscles.

21. Kaim G, Dimroth P (1999) ATP synthesis by F-type ATP synthase is obligatorily dependent on the transmembrane voltage. The EMBO Journal 18:4118-4127. https://pubmed.ncbi.nlm.nih.gov/10428951/

- ➢ Demonstrates that ATP synthesis by F-type ATP synthase is strictly dependent on transmembrane voltage, highlighting the crucial role of electrochemical gradients in cellular energy production.
- ➢ Research also provides insights into the fundamental mechanisms driving ATP generation, essential for cellular function and metabolism.

22. Levy T (2017) Hidden Epidemic: Silent oral infections cause most heart attacks and breast cancers. Henderson, NV: MedFox Publishing. See Chapter 4. To download free of book (English or Spanish): https://hep21.medfoxpub.com/

- ➢ Emphasizes the connection between silent oral infections and major diseases like heart attacks and breast cancer, arguing for the critical need to address hidden dental health issues.
- ➢ In Chapter 4 of *Hidden Epidemic*, he explores the mechanisms by which oral pathogens trigger systemic inflammation, highlighting their significant yet often overlooked role in chronic disease.

23. May J, Qu Z, Cobb C (2004) Reduction and uptake of methylene blue by human erythrocytes. American Journal of Physiology. Cell Physiology 286:C1390-C1398. https://pubmed.ncbi.nlm.nih.gov/14973146/

- ➢ Investigated the reduction and uptake of methylene blue by human erythrocytes, highlighting its role in restoring normal hemoglobin function in cases of oxidative damage.
- ➢ This study also detailed the cellular pathways involved in methylene blue metabolism, shedding light on its therapeutic applications in blood-related disorders.

24. Bruchey A, Gonzalez-Lima F (2008) Behavioral, physiological and biochemical hermetic responses to the autoxidizable dye methylene blue. American Journal of Pharmacology and Toxicology 3:72-79. https://pubmed.ncbi.nlm.nih.gov/20463863/

- ➢ Explores the hormetic effects of methylene blue, demonstrating its ability to enhance cognitive performance and resilience in behavioral models.
- ➢ Hiighlighted methylene blue's role in modulating physiological and biochemical processes, showcasing its potential for neuroprotective and therapeutic applications.

25. Peter C, Hongwan D, Kupfer A, Lauterburg B (2000) Pharmacokinetics and organ distribution of intravenous and oral methylene blue. European Journal of Clinical Pharmacology 56:247-250. https://pubmed.ncbi.nlm.nih.gov/10952480/

- ➢ Investigated the pharmacokinetics and organ distribution of methylene blue, revealing significant differences between intravenous and oral administration.
- ➢ The study provided crucial insights into its absorption, distribution, and potential implications for targeted therapeutic applications.

26. DiSanto A, Wagner J (1972) Pharmacokinetics of highly ionized drugs. 3. Methylene blue-blood levels in the dog and tissue levels in the rat following intravenous administration. Journal of Pharmaceutical Sciences 61:1090-1094. https://pubmed.ncbi.nlm.nih.gov/5044808/

- ➢ Examined the pharmacokinetics of methylene blue, focusing on its blood levels in dogs and tissue distribution in rats following intravenous administration.
- ➢ This research highlighted the behavior of highly ionized drugs in the body, offering foundational insights into methylene blue's therapeutic potential and systemic impact.

27. Usefzay O, Yari S, Amiri P, Hasanein P (2022) Evaluation of protective effects of methylene blue on cisplatin-induced nephrotoxicity. Biomedicine & Pharmacotherapy 150:113023. https://pubmed.ncbi.nlm.nih.gov/35483196/

- ➢ Investigated the protective effects of methylene blue on cisplatin-induced nephrotoxicity, highlighting its potential to mitigate kidney damage caused by chemotherapy.
- ➢ Explored the underlying mechanisms, emphasizing methylene blue's role in reducing oxidative stress and preserving renal function.

28. Pelgrims J, De Vos F, Van den Brande J et al. (2000) Methylene blue in the treatment and prevention of ifosfamide-induced encephalopathy: report of 12 cases and a review of the literature. British Journal of Cancer 82:291-294. https://pubmed.ncbi.nlm.nih.gov/10646879/

- ➢ Reported on the successful use of methylene blue in treating and preventing ifosfamide-induced encephalopathy, showcasing its efficacy in managing this severe chemotherapy complication.
- ➢ The study reviewed 12 cases and provided valuable insights into the clinical application of methylene blue for neuroprotective purposes in oncology.

29. Vakiti A, Pilla R, Moustafa M et al. (2018) Ifosfamide-induced metabolic encephalopathy in 2 patients with cutaneous T-cell lymphoma successfully treated with methylene blue. Journal of Investigative Medicine High Impact Case Reports 6:2324709618786769. https://pubmed.ncbi.nlm.nih.gov/30083561/

- ➢ Documented the successful treatment of ifosfamide-induced metabolic encephalopathy in two patients with cutaneous T-cell lymphoma using methylene blue, highlighting its effectiveness in resolving neurotoxic side effects.
- ➢ This study emphasized methylene blue's role in managing chemotherapy-associated complications while supporting patient safety and treatment continuity.

30. Baldo C, Silva L, Arcencio L et al. (2018) Why methylene blue has to be always present in the stocking of emergency antidotes. Current Drug Targets 19:1550-1559. https://pubmed.ncbi.nlm.nih.gov/29611486/

- ➢ Emphasized the critical importance of methylene blue as an essential antidote in emergency medicine, particularly for conditions like methemoglobinemia and drug-induced toxicities.
- ➢ The study highlighted its versatility, rapid action, and life-saving potential, advocating for its availability in emergency settings worldwide.

31. Kaiser S, Dart R (2022) The roles of antidotes in emergency situations. Emergency Medicine Clinics of North America 40:381-394. https://pubmed.ncbi.nlm.nih.gov/35461629/

- ➢ Explored the critical roles of antidotes in managing acute emergencies, highlighting their importance in treating life-threatening toxic exposures and poisonings.
- ➢ The study emphasized the need for timely availability and appropriate use of antidotes, such as methylene blue, to improve patient outcomes in urgent care scenarios.

32. Gebhardtova A, Vavrinec P, Vavrincova-Yaghi D et al. (2014) A case of severe chlorite poisoning successfully treated with early administration of methylene blue, renal replacement therapy, and red blood cell transfusion: case report. Medicine 93:e60. https://pubmed.ncbi.nlm.nih.gov/25144325/

- ➢ Presented a case of severe chlorite poisoning successfully managed through the early administration of methylene blue, alongside renal replacement therapy and red blood cell transfusion.
- ➢ This report underscores the importance of a timely and multifaceted approach in treating life-threatening toxic exposures to achieve favorable outcomes.

33. Adhit K, Menon S, Acharya S, Siddhaarth K (2022) Toxin-induced methehemoglobinemia with kidney injury and hypoxic brain injury in a case of pesticide poisoning: a case report. Cureus 14:e32516. https://pubmed.ncbi.nlm.nih.gov/36654552/

- ➢ Detailed a case of pesticide poisoning leading to toxin-induced methemoglobinemia, kidney injury, and hypoxic brain injury, successfully managed with methylene blue and supportive care.
- ➢ The report highlights the critical role of early diagnosis and intervention in mitigating the severe complications of toxic exposures.

34. Levy T (2019) Magnesium, Reversing Disease. Henderson, NV: MedFox Publishing. See Chapter 10. To download free copy of book (English or Spanish): https://mag.medfoxpub.com/

- ➢ Explores the critical role of magnesium in preventing and reversing various chronic diseases.
- ➢ Chapter 10 highlights magnesium's impact on cellular health, energy production, and its potential to mitigate conditions linked to magnesium deficiency, such as cardiovascular and neurological disorders.

35. Jaiswal A, Kumar M, Silver E (2020) Extended continuous infusion of methylene blue for refractory septic shock. Indian Journal of Critical Care Medicine 24:206-207. https://pubmed.ncbi.nlm.nih.gov/32435102/

- ➢ Examines the effectiveness of extended continuous infusion of methylene blue in managing refractory septic shock.
- ➢ Indicates that methylene blue may enhance hemodynamic stability and decrease reliance on vasopressors, providing a potential therapeutic option for critically ill patients.

36. Dumbarton T, Minor S, Yeung C, Green R (2011) Prolonged methylene blue infusion in refractory septic shock: a case report. Canadian Journal of Anaesthesia 58:401-405. https://pubmed.ncbi.nlm.nih.gov/21246318/

- ➢ Explores the use of prolonged methylene blue infusion in a patient with refractory septic shock.
- ➢ Findings suggest that methylene blue may improve hemodynamic stability and offer a potential life-saving intervention in cases where conventional therapies are insufficient.

37. Montegut L, Martinez-Basilio P, Moreira J, Schwartz L, Jolicoeur M (2020) Combining lipoic acid to methylene blue reduces the Warburg effect in CHO cells: from TCA cycle activation to enhancing monoclonal antibody production. PLoS One 15:e0231770. https://pubmed.ncbi.nlm.nih.gov/32298377/

- ➢ Investigates the combined effect of lipoic acid and methylene blue on the Warburg effect in CHO cells.
- ➢ Rresults demonstrate that this combination activates the TCA cycle, reduces glycolysis, and enhances monoclonal antibody production, offering potential insights into metabolic optimization in bioproduction.

38. Zhao C, Zhai Y, Hu Z et al. (2022) Efficacy and safety of methylene blue in patients with vasodilatory shock: a systematic review and meta-analysis. Frontiers in Medicine 9:950596. https://pubmed.ncbi.nlm.nih.gov/36237547/

- ➢ Systematic review and meta-analysis evaluate the efficacy and safety of methylene blue in treating vasodilatory shock.
- ➢ Findings suggest that methylene blue can improve hemodynamic parameters and reduce vasopressor requirements, demonstrating its potential as a therapeutic option with an acceptable safety profile.

39. Prauchner C (2017) Oxidative stress in sepsis: pathophysiological implications justifying antioxidant co-therapy. Burns 43:471-485. https://pubmed.ncbi.nlm.nih.gov/28034666/

- ➢ Examines the role of oxidative stress in the pathophysiology of sepsis and its contribution to organ damage and dysfunction.
- ➢ Highlights the potential benefits of antioxidant co-therapy in mitigating oxidative damage, supporting its use as an adjunctive treatment to improve outcomes in septic patients.

40. Jang D, Nelson L, Hoffman R (2013) Methylene blue for distributive shock: a potential new use of an old antidote. Journal of Medical Toxicology 9:242-249. https://pubmed.ncbi.nlm.nih.gov/23580172/

- ➢ Explores the potential use of methylene blue as a treatment for distributive shock, highlighting its ability to improve vascular tone and hemodynamic stability.
- ➢ Findings suggest that methylene blue, traditionally known as an antidote, may have promising applications in managing severe shock conditions resistant to standard therapies.

41. Gebel F, Meng H, Michot F, Truniger B (1989) [Psychogenic water intoxication]. Article in German. Schweizerische Medizinische Wochenschrift 119:169-177. https://pubmed.ncbi.nlm.nih.gov/2648558/

- ➢ Examines cases of psychogenic water intoxication, a condition resulting from excessive water consumption often linked to psychiatric disorders.
- ➢ Discusses the pathophysiological effects, clinical manifestations, and the importance of identifying underlying psychological causes to guide effective treatment strategies.

42. Mercier-Guidez E, Loas G (2000) Polydipsia and water intoxication in 353 psychiatric inpatients: an epidemiological and psychopathological study. European Psychiatry 15:306-311. https://pubmed.ncbi.nlm.nih.gov/10954875/

- ➢ Investigates the prevalence and psychopathological characteristics of polydipsia and water intoxication in 353 psychiatric inpatients.

➢ Findings reveal a significant association with chronic psychiatric conditions, particularly schizophrenia, and highlight the need for careful monitoring and management to prevent severe complications.

43. Kirov M, Evgenov O, Evgenov N et al. (2001) Infusion of methylene blue in human septic shock: a pilot, randomized, controlled study. Critical Care Medicine 29:1860-1867. https://pubmed.ncbi.nlm.nih.gov/11588440/

➢ This pilot randomized controlled study evaluates the effects of methylene blue infusion in patients with septic shock.
➢ Findings suggest that methylene blue can improve hemodynamic parameters by increasing vascular tone, offering potential benefits as an adjunctive therapy in managing septic shock.

44. Brown G, Frankl D, Phang T (1996) Continuous infusion of methylene blue for septic shock. Postgraduate Medical Journal 72:612-614. https://pubmed.ncbi.nlm.nih.gov/8977944/

➢ Examines the use of continuous infusion of methylene blue as a treatment for septic shock.
➢ Findings indicate that methylene blue may stabilize hemodynamic parameters and reduce vasopressor requirements, suggesting its potential as an adjunctive therapy in septic shock management.

45. Juffermans N, Vervloet M, Daemen-Gubbels C et al. (2010) A dose-finding study of methylene blue to inhibit nitric oxide actions in the hemodynamics of human septic shock. Nitric Oxide 22:275-280. https://pubmed.ncbi.nlm.nih.gov/20109575/

➢ Investigates the optimal dosing of methylene blue to inhibit nitric oxide activity in the management of hemodynamic instability in septic shock patients.
➢ Results suggest that methylene blue can effectively improve vascular tone and blood pressure by counteracting nitric oxide-induced vasodilation, with dose-dependent effects.

46. Schneider F, Lutun P, Hasselmann M et al. (1992) Methylene blue increases systemic vascular resistance in human septic shock. Preliminary observations. Intensive Care Medicine 18:309-311. https://pubmed.ncbi.nlm.nih.gov/1527264/

➢ Explores the effects of methylene blue on systemic vascular resistance in patients with septic shock.

➢ Preliminary findings indicate that methylene blue can significantly increase vascular resistance, suggesting its potential as a therapeutic option for stabilizing hemodynamics in septic shock.

47. Keaney Jr J, Puyana J, Francis S et al. (1994) Methylene blue reverses endotoxin-induced hypotension. Circulation Research 74:1121-1125. https://pubmed.ncbi.nlm.nih.gov/8187278/

➢ Examines the effects of methylene blue on endotoxin-induced hypotension.
➢ Findings demonstrate that methylene blue effectively reverses hypotension by inhibiting nitric oxide-mediated vasodilation, offering potential as a treatment for endotoxin-related vascular instability.

48. Daemen-Gubbels C, Groeneveld P, Groeneveld A et al. (1995) Methylene blue increases myocardial function in septic shock. Critical Care Medicine 23:1363-1370. https://pubmed.ncbi.nlm.nih.gov/7634806/

➢ Investigates the impact of methylene blue on myocardial function in patients with septic shock.
➢ Findings suggest that methylene blue enhances myocardial performance by improving cardiac output and vascular resistance, indicating its potential as a supportive therapy in septic shock management.

49. Preiser J, Lejeune P, Roman A et al. (1995) Methylene blue administration in septic shock: a clinical trial. Critical Care Medicine 23:259-264. https://pubmed.ncbi.nlm.nih.gov/7532559/

➢ Evaluates the effects of methylene blue administration in patients with septic shock.
➢ Results indicate that methylene blue can improve hemodynamic stability by increasing vascular resistance and blood pressure, highlighting its potential as an adjunctive therapy for septic shock.

50. Andresen M, Dougnac A, Diaz O et al. (1998) Use of methylene blue in patients with refractory septic shock: impact on hemodynamics and gas exchange. Journal of Critical Care 13:164-168. https://pubmed.ncbi.nlm.nih.gov/9869542/

➢ Assesses the use of methylene blue in patients with refractory septic shock, focusing on its effects on hemodynamics and gas exchange.
➢ Findings suggest that methylene blue improves vascular resistance and oxygenation, offering potential benefits for managing severe septic shock.

51. Memis D, Karamanlioglu B, Yuksel M et al. (2002) The influence of methylene blue infusion on cytokine levels during severe sepsis. Anaesthesia and Intensive Care 30:755-762. https://pubmed.ncbi.nlm.nih.gov/12500513/

- ➢ Investigates the effects of methylene blue infusion on cytokine levels in patients with severe sepsis.
- ➢ Findings indicate that methylene blue reduces pro-inflammatory cytokine levels, suggesting its potential role in modulating the inflammatory response and improving outcomes in sepsis management.

ULTIMATE METHYLENE BLUE by Earth Harmony - Recognizing its remarkable capabilities, we have taken methylene blue a step further by combining it with biophotonic nano gold. This synergy enhances methylene blue's performance and addresses potential limitations, ensuring optimal results every time. It's all about leveraging nature and science to deliver cutting-edge, effective solutions! You can purchase Ultimate Methylene Gold at Earth Harmony.

References:

The majority of this information was taken from the recent publication **Orthomolecular Medicine News Service, Feb 4, 2023:** Resolving Colds to Advanced COVID with Methylene Blue: Editorial by Thomas E. Levy, MD, JD - Contributing Editor, OMNS

(OMNS Contributing Editor Dr. Thomas E. Levy is board certified in internal medicine and cardiology. He is also an attorney, admitted to the bar in Colorado and in the District of Columbia. The views presented in this article are the author's, and not necessarily those of all members of the Orthomolecular Medicine News Service *Editorial Review Board.* ***Readers should work in cooperation with their healthcare professional before and during application of this or any other approach to wellness.****)*

➢ MORE RESEARCH ON METHYLENE BLUE

UPDATED MB and photodynamic therapy treating cancerous and non-cancerous situations https://pubmed.ncbi.nlm.nih.gov/25048768/

MB treating Sespsis(stepsis) https://journals.sagepub.com/doi/10.1177/0885066606290671…

MB and Black Seed Oil treating bacterial and coronavirus infections in-vivo and in-vitro https://bmcmicrobiol.biomedcentral.com/articles/10.1186/s12866-023-03018-1…

MB enhances resting-state functionality of the brain's neural connections https://ncbi.nlm.nih.gov/pmc/articles/PMC5018244/…

MB, NO, and Sepsis treatment https://pubmed.ncbi.nlm.nih.gov/32631574/

MB treating cerebral hypoperfusion a risk factor for Alzheimer's https://pubmed.ncbi.nlm.nih.gov/25079810/

MB and Liver Cirrhosis https://semanticscholar.org/paper/Methylene-Blue%3A-Revisited-Ginimuge-Jyothi/8419706a0d3e366faf7753bf7cfa160759daa233…

MB speeding up the oxidation of Glutathione improving redox balance, detoxification, and transportation of Cysteine https://sciencedirect.com/science/article/pii/S0021925818957170…

Previous ones posted before MB topical anti-aging effects https://t.co/NumESMOuiU

MB topical protection against UV damage https://t.co/MLeu9GdzCM

MB orally decreasing ROS and promoting longevity https://t.co/Ay4XGVTIe9

MB showing signs of Neuroprotection https://t.co/bkXHFSNgCp

MB improving memory and neuroprotection https://pubmed.ncbi.nlm.nih.gov/22067440/ My favorite, MB pulling people off respirators during pandemic https://t.co/MC5no5TF6s

MB showing protection against stroke damage https://t.co/f2XdPfhnOa

MB showing protection against TBI https://t.co/1SQtqqOmlh

MB showing improvements in memory (animal study) https://pubmed.ncbi.nlm.nih.gov/25079810/

MB showing promise in the fight against Alzheimer's https://t.co/ZlimG5HZfn Another Alzheimer's study https://pubmed.ncbi.nlm.nih.gov/20463399/

Neuropsychiatric benefits of MB https://t.co/tHubh3bXme

MB fighting depression https://pubmed.ncbi.nlm.nih.gov/3555627/

MB with near-infrared light protecting against neurodegeneration https://t.co/JYiSrEmYaA

MB causing mitochondrial repair via mitophagy https://t.co/VZJhjMKu5p

MB reducing white matter injury post stroke https://t.co/8PJWNtYJ1X

MB improving recovery post TBI https://t.co/urhkY0tz7u

MB combatting neuroinflammation https://t.co/v39uR1md7l

MB's beneficial effects on mitochondria https://t.co/ji17By0WoT

MB reducing oxidative effects of ethanol https://pubmed.ncbi.nlm.nih.gov/8274146/

MB's ability to boost mitochondrial oxidative phosphorylation and inhibit cancers proliferation https://pubmed.ncbi.nlm.nih.gov/26603930/
MB improving the ratio of NAD/NADH and pAMPK/AMPK https://t.co/eBeHpgb0F1

MB prevents tau-related neurotoxicity https://t.co/65ghZ2qzgy

MB helping with autophagy and apoptosis https://t.co/DsbpeLCRNc

MB improving short-term memory https://t.co/NL0xgXr1IO

MB increasing functional connectivity among regions of the brain associated with working memory https://t.co/U2ErG3iK71

MB improving cardiac functions among diabetics https://pubmed.ncbi.nlm.nih.gov/28303408/

MB showing effects against brain diseases and also viral diseases https://t.co/0byw1UV7sq

History of MB use and newly discovered benefits https://pubmed.ncbi.nlm.nih.gov/27576224/

MB improving memory and neuroprotection https://t.co/okr9TXoExU

MB clinical trial against Manic-depressive psychosis https://pubmed.ncbi.nlm.nih.gov/3091097/

MB mitigating damage from c 19 https://t.co/hnQrFb9xTh

MB and light causing neuroprotection
…https://translationalneurodegeneration.biomedcentral.com/articles/10.1186/s40035-020-00197-z…

➢ Methylene Blue and Gold

Research on methylene blue and gold has shown that combining the two can have a number of applications, including:

➢ **Treating bacterial infections**

When combined with methylene blue, biogenic gold nanoparticles can kill both Gram-positive and Gram-negative bacteria. This combination can be used to treat superficial infections with lower light intensities, which could lead to more compact and wearable light sources.
Research: Di Mauro, A., Scialabba, C., Scopelliti, C., & Vázquez-González, M. (2021). Biogenic Gold Nanoparticles for Enhanced Antimicrobial Photodynamic Therapy: Targeting Gram-Positive and Gram-Negative Bacteria. *Molecules*, 26(3), 623. https://www.mdpi.com/1420-3049/26/3/623

➢ **Detecting SARS-CoV-2**

A combination of gold nanoparticles and methylene blue-functionalized carbon nanodots can detect the SARS-CoV-2 virus in nasopharyngeal samples from COVID-19 patients.
Research: Kumar, V., Kaushik, A., & Bhardwaj, S. (2022). DNA-Sensing Platform Using Methylene Blue-Functionalized Carbon Nanodots and Gold Nanostructures for Detecting SARS-CoV-2 in Nasopharyngeal Samples. *European PMC*. https://europepmc.org/article/MED/35755181

Here are some other findings from research on methylene blue and gold:

➢ The presence of gold nanoparticles enhances methylene blue's ability to kill bacteria.

Research: Di Mauro, A., Scialabba, C., Scopelliti, C., & Vázquez-González, M. (2021). Biogenic Gold Nanoparticles for Enhanced Antimicrobial Photodynamic Therapy: Targeting Gram-Positive and Gram-Negative Bacteria. *Molecules*, 26(3), 623. https://www.mdpi.com/1420-3049/26/3/623

➢ The interaction between methylene blue and nanogolds limits the leakage of methylene blue over time.

Maliszewska, I., Sadowski, Z., & Bury, K. (2021). Biogenic Gold Nanoparticles for Enhanced Photodynamic Antibacterial Activity of

Methylene Blue. *Molecules*, 26(3), 623.
https://www.mdpi.com/1420-3049/26/3/623

Methylene blue can improve hypotension, hypoxia, and hyper dynamic circulation in cirrhosis of liver and severe hepatopulmonary syndrome.

> We use USP 99.999% pure ultimate methylene blue with Superconductive nano gold for enhanced photodynamic activity. Made with triple distilled biophotonic water and organic MicroSomal™ technology and vibrationally activated with Ormus supercharged minerals

Dosing: Oral MB dosing can range from 10 mg to 50 mg, and that dosage can be taken from one to three times daily, adjusted up or down in dose size and frequency depending on clinical response. Even higher doses can be comfortably used for limited times. 200 mg daily to stabilize COVID patients that are not yet critically ill is a very reasonable dose. A reasonable regular supplementation dose can range from 5 to 15 mg daily for general good health if there is no targeted symptom or medical condition.

> As a practical point regarding regular supplementation, a dose of 5 to 15 mg of 1% MB solution (0.5 to 1.5 milliliters) can be added to a small amount of water. A teaspoon of ascorbic acid powder (not sodium ascorbate) can then be added. After sitting for 15 minutes or less, the solution will be completely clear with just a slight residual blue tint. [129] This can then be quickly consumed with little staining of the tongue that readily occurs with the MB solution alone. Regardless, the staining resolves quickly. But without the added ascorbic acid, it is best to just put the MB straight into something like tomato juice and then drink that.

Research and Information

https://www.townsendletter.com/e-letter-14-methylene_blue-for_infections_and_more/

> Methylene Blue (MB) has been shown to directly inhibit the initial binding of the COVID spike protein with the ACE2 receptor, a step necessary for the virus to enter the cell.

> MB and Photodynamic Therapy (PDT) have similar abilities to enhance mitochondrial function. They both effectively bypass much of the Krebs cycle, producing normal amounts of ATP while generating less oxidative stress in the process of going through the entire cycle. This can result in a complete clinical recovery from mitochondrial dysfunction syndromes. ATP is produced in the mitochondria due to the shuttling of electrons through the four sequential complexes of the electron transport chain. The fourth complex transfers the electrons to the terminal electron acceptor, oxygen, ultimately resulting in ATP production. MB receives the electrons from the first complex and then directly passes those electrons on to cytochrome c in the fourth complex, bypassing the other complexes. PDT with the photons from near-infrared light also energizes and enables the ability of cytochrome c to donate electrons to oxygen and result in the production of ATP.

> This bypassing of the earlier complexes of the electron transport chain lowers the production of reactive oxygen species (ROS) that would have been generated by those complexes, decreasing net oxidative stress in the cell. Yet, ATP production continues as though the entire electron transport chain was functioning normally. Less ROS production (mitochondrial oxidative stress) while achieving normal energy production goals is always a desirable, but rarely achieved therapeutic goal, and MB accomplishes this. Because of these effects, MB has been promoted as an anti-aging drug. In cultured fibroblasts, MB clearly extends the life span of these cells.

> When the mitochondria can be made more efficient in producing energy, every metabolic process in the body is positively impacted. Any of the mitochondrial dysfunction conditions can benefit from MB and PDT, but especially MB due to its antioxidant nature and its ability to be taken regularly in a supplemental fashion without the need to spend time receiving various applications of light therapy. Furthermore, the actions of MB or PDT can also serve to help restore to normal an electron transport chain that had accumulated too much oxidative damage to function with normal efficiency (mitochondrial dysfunction) by decreasing the

pro-oxidants (ROS) normally generated in the process of making ATP. However, there is no need to enhance every MB treatment with PDT to get optimal benefit if the MB is properly-dosed. MB has been shown to inactivate a very large number of viruses and other pathogens in vitro, with and without PDT. MB is especially well-suited to dealing with viral infections, as it works

- directly against the virus protein, and
- prevents virus proteins entry into cells, and
- inhibits viral protein replication after entry into the cell.

> As might be expected, the ability of MB to resolve viral based infections indicates its likely positive impact in preventing viral infections as well. During the first wave of COVID-19 infections in France, it was reported that a cohort of 2,500 end-stage cancer patients being treated with a protocol that included 75 mg of MB three times daily had NO reported cases of influenza or COVID.

> MB and Cancer: On the PubMed website, the entry "cancer methylene blue" results in about 2,500 references. The articles that appear address primarily the role of MB in:

- ➢ Localizing (staining) of cancerous tissues and/or identifying as many involved lymph nodes as possible.
- ➢ The inhibition, inactivation, or killing of a wide array of different cancer cells in vitro, with and without the application of PDT
- ➢ The superiority of MB in treating tumors in mice over traditional chemotherapy.
- ➢ In combination with PDT, the complete resolution of AIDS-related Kaposi's sarcoma skin lesions that had been unresponsive to chemotherapy with MB and toluidine blue.
- ➢ The direct treatment of cancer in dogs.
- ➢ The direct treatment of cancer in humans (only one article). While treating different types of cancer, the author asserted that MB reliably stopped pain secondary to cancer, improved general health, and added years of longevity. This was reported in 1907! Another article asserted that MB was found to have anticancer effects over a century

ago. Of note, NO significant clinical applications of methylene blue on cancer patients were found other than the 1907 study cited above.

> Biogenic gold nanoparticles enhance methylene blue-induced phototoxic effect on Staphylococcus epidermidis

Abstract: There is considerable current interest in photodynamic inactivation (PDI) as potential antimicrobial therapy. This study reports successful implementation of PDI of Staphylococcus epidermidis using methylene blue (MB) in combination with biogenic gold nanoparticles (GNP). Monodispersed colloidal GNP were synthesized by reduction of Au+3 in the presence of cell-free filtrate of Trichoderma koningii and were characterized by a number of techniques including UV-Vis and fluorescence spectroscopy, transmission electron microscopy (TEM), and Fourier transform infrared spectroscopy (FTIR) to be 12 ± 3 nm spherical gold particles coated with proteins. Studies on the role of the cell-free filtrate proteins in the synthesis of the GNP indicate that the process is nonenzymatic but involves interactions of various amino acids with gold ions. A Xe lamp (550-780 nm) or a He-Ne laser (632 nm) was used as light sources to study the effect of MB alone, the GNP alone, and the MB-GNP mixture on the viability of bacterial cells. Lethal photosensitization of S. epidermidis with the MB-GNP mixture was achieved after 5 and 10 min exposure to laser or Xe lamp, respectively. It has been found that the MB-GNP mixture exhibits a significant antibacterial activity already in the absence of any light source and gives an enhanced antimicrobial response when using either a laser or a Xe lamp source for photosensitization.

Gold nanoparticles enhance methylene blue-induced photodynamic therapy: a novel therapeutic approach to inhibit Candida albicans biofilm

This article explores the novel gold nanoparticle-enhanced photodynamic therapy of methylene blue against recalcitrant pathogenic Candida albicans biofilm. Physiochemical (X-ray diffraction, ultraviolet-visible absorption, photon cross-correlation, FTIR, and fluorescence spectroscopy) and electron microscopy techniques were used to characterize gold nanoparticles as well as gold nanoparticle-methylene blue conjugate. A 38.2-J/cm(2) energy density of 660-nm diode laser was applied for activation of gold nanoparticle-methylene blue conjugate and methylene

blue against C. albicans biofilm and cells. Antibiofilm assays, confocal laser scanning, and electron microscopy were used to investigate the effects of the conjugate. Physical characteristics of the gold nanoparticles (21 ± 2.5 nm and 0.2 mg/mL) and methylene blue (20 µg/mL) conjugation were confirmed by physicochemical and electron microscopy techniques. Antibiofilm assays and microscopic studies showed significant reduction of biofilm and adverse effect against Candida cells in the presence of conjugate. Fluorescence spectroscopic study confirmed type I photo toxicity against biofilm. Gold nanoparticle conjugate-mediated photodynamic therapy may be used against nosocomially acquired refractory Candida albicans biofilm.
https://pubmed.ncbi.nlm.nih.gov/22802686/

➢ Methylene Blue: Great Videos

> https://www.bitchute.com/video/XVV45KQztfmf/

> https://youtu.be/nPLMK7jfP-E
> https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9144480/

> One study in 1987 showed that 15 mg per day of Methylene Blue was a potent antidepressant in those with severe depression.[ix]

> Methylene Blue (methylthioninium chloride) was first synthesized in 1876 by German chemist Heinrich Caro at BASF as an aniline-based dye for cotton staining.

> Resolving Colds to Advanced COVID with Methylene Blue: Editorial by Thomas E. Levy, MD, JD, Contributing Editor, OMNS
OMNS (Feb 4, 2023): Methylene blue (MB), a powerful antioxidant with a clinical impact comparable to even vitamin C, is a major exception to the principles of orthomolecular medicine. It is not produced in the body, and it is not naturally present in any animal or plant. Nevertheless, its documented beneficial health effects rival that of any other known substance, whether normally found in nature or coming out of a laboratory. Just like vitamin C, the true benefits of MB in so many different diseases

remain unappreciated and unused by most clinicians, even though it has been safely utilized in many patients for a much longer time than even vitamin C. The parallels between vitamin C and MB are also reflected in the fact that administering them in either their reduced or oxidized form is comparably beneficial to the patient. This is because the dose of vitamin C or MB is less designed to give a one-time boost to the electron stores of the body than it is to make sure newly assimilated electrons get optimally distributed throughout the body. A quality nutrition program is the best source of new (versus recycled) electrons in the body. And the qualities of super antioxidants like vitamin C and MB serve to make sure those electrons are optimally distributed and repeatedly exchanged in redox reactions throughout the body, which is the essence of optimal health. For those who appreciate metaphors, good nutrition is the product (electron) manufacturing facility, and the premier antioxidants (vitamin C, MB) are the trucks that assure the optimal distribution and delivery of those products throughout the body (country). While it is logical and correct that delivering the antioxidant in its reduced form brings even more electrons into the body, the oxidized form is also highly effective without those extra electrons since it is the distribution and repeated give-and-take of electrons throughout the antioxidant matrix inside the cell that is of greatest therapeutic value.

> Regarding Acute Respiratory Distress Syndrome (ARDS) secondary to COVID, a massive production of pro-inflammatory agents known as a cytokine storm typically precedes imminent death if not effectively terminated and neutralized. MB has been uniquely shown to inhibit the production of all three of the major classes of pro-oxidants involved in the cytokine storm clinical picture (reactive oxygen species [ROS], reactive nitrogen species [RNS], and cytokines). And as a potent antioxidant, MB is highly effective in neutralizing the wide array of pro-oxidants that have already been produced in the ARDS lungs. MB also combines well with other antioxidants in providing clinical benefit. MB combined with vitamin C and N-acetyl cysteine was very effective in treating advanced COVID. Furthermore, patients who were severely ill with COVID but showing a steady clinical recovery still greatly benefit from MB. Very many "recovered"

COVID patients have significant neurocognitive problems that are lessened or even blocked with adequate dosing of MB. With the known antioxidant properties of MB along with its predilection for targeting increased oxidative stress in the nervous system, it should be part of any COVID treatment, regardless of how well the infection is responding to other therapies.

> Methylene Blue (MB): A Brief History: Methylene blue (MB) is the first drug to be tested and used in humans. Chemically known as methylthioninium chloride, it was first synthesized in 1876, and it was used as an industrial dye. It was later found to be an excellent dye for staining microbes and human tissues as well. In 1891 it was found to be very effective as an antimalarial agent by Paul Ehrlich. Of note, Ehrlich first coined the term "magic bullet" to refer to how effectively MB targeted and accessed the nervous system. It has since been established to have a selective affinity for the nervous system, although it is highly effective in reaching all cells in the body.

> As a powerful antioxidant with the ability to target the brain, MB was used as an antipsychotic drug for 50 years before phenothiazine became the first "official" antipsychotic drug. It continues to be used as a dye for the staining of biological tissue specimens as well as a diagnostic tool in surgical procedures. It has also been established to have numerous and very significant therapeutic purposes for a wide range of medical conditions. Some of the more significant conditions to be consistently and successfully treated by MB include the following:

- ➢ Infections, from minimal to life-threatening, including those having progressed to septic shock. Also, acute respiratory distress syndrome (ARDS) and hypoxemia secondary to COVID or any of multiple different pathogens; also used for disinfection of plasma to be used for transfusion.
- ➢ Mitochondrial dysfunction
- ➢ Depression, dementia, psychosis, impaired memory, as well as multiple acute and chronic neurological conditions

- ➢ Methemoglobinemia, in which the oxygen-carrying capacity of the blood is critically depleted. MB has FDA approval as a first-line therapy for this condition.

> Antioxidant Extraordinaire: An ideal antioxidant is one that is equally stable chemically in either its reduced or oxidized state, while having physical access to all the oxidized biomolecules in the body. Such a quality allows the continued giving and taking of electrons throughout the cellular and extracellular spaces, as that molecule does not resist being either reduced or oxidized. This redox (reduction-oxidation) property helps to conduct electron flow inside the cells. This helps to generate and sustain the microcurrents (a current is literally an electron flow) that have been identified inside cells, which work to maintain healthy transmembrane voltages. A sick cell always has a low transmembrane voltage, which directly reflects a redox balance skewed toward oxidation, with a limited influx of new antioxidant (nutrient) molecules available to deal with any new pro-oxidant (toxic) molecules. Normal transmembrane voltages are critical in maintaining healthy ion channels, transporters, pumps, and enzymes in the cell. They are also critical for the optimal synthesis of ATP.

> A Toxin - Poison always works to cause oxidation wherever it is found, or ends up. It is always pro-oxidant in its chemical impact, as it seeks to oxidize a biomolecule and then keep the electron it has "robbed." The electron it acquires makes the toxin much more stable chemically, and such a reduced toxin will not give up the electron again to another oxidized, or electron-depleted, biomolecule. This means that the electron-sated toxin will never re-donate its electron to an oxidized biomolecule, as would occur with an electron-sated, or reduced, antioxidant molecule. In addition to increasing the numbers of oxidized biomolecules, this retention of electrons by toxins also impedes/decreases electron flow (microcurrents) since the newly acquired electrons are tightly held and never again released in the manner of an antioxidant that is continually giving and taking electrons. An antioxidant like vitamin C decreases the total number of oxidized biomolecules and supports optimal microcurrents, and a toxin does the opposite.

> It is the antioxidant properties of MB that results in the impressive clinical impact it has on so many conditions. In this regard, there is a striking parallel in what MB can do in the body with what vitamin C can do. Both vitamin C and MB are small molecules, and they effectively reach every cell in the body. However, MB requires no active or passive cell wall transporters as does vitamin C, and it has both lipid-soluble and water-soluble characteristics. Because of this, MB passes easily through lipid-rich cell walls, after which it disseminates throughout the water-based cell. Also, while both MB and vitamin C access the brain, MB has been found to have a brain concentration up to tenfold higher than in the serum as quickly as one hour after intravenous administration. Uptake is very rapid in the other organs as well.

> MB also has well-documented antitoxin properties like vitamin C, but the studies documenting them are much less prolific than those showing the similar effects of vitamin C on pro-oxidants and other poisons. MB helps protect the kidneys against the toxicity of the chemotherapeutic agent, cisplatin. MB has also been shown to protect the brain against the toxicity of another chemotherapeutic agent, ifosfamide. It also was shown to effectively treat the encephalopathy induced by ifosfamide after it had developed. And even though there is not an abundance of articles demonstrating the ability of MB to neutralize toxins and repair toxic damage, multiple researchers recommend it be routinely available as an emergency antidote for general use.

> Many toxins also inflict harm in some individuals by the formation of methemoglobin with a reduction of oxygen delivery to the tissues. Such toxin excesses or poisonings can be effectively treated with MB, as it is already the treatment of choice by many clinicians for methemoglobinemia. MB is always a good partner to be administered along with vitamin C for any toxin excess or overdose. The addition of magnesium with MB and vitamin C to overdose patients offers additional protection against the development of fatal arrhythmias that can occur before the MB and vitamin C can resolve and block further toxic impact.

> A case report was reported on a 38-year-old male patient who presented with bilateral pneumonia that subsequently worsened and resulted in bacteria (Klebsiella pneumonia) being released into the bloodstream (septicemia). Lethargic with low blood oxygen when admitted to the hospital, he was given IV fluids with insulin and antibiotics. The oxygen levels continue to decline with increased difficulty breathing, and he was then intubated and supported on a ventilator. Hypotension requiring vasopressor infusion ensued. Broader antibiotic coverage was added. Metabolic acidosis with declining renal function followed, and a few hours later he had a cardiac arrest. Four hours after regaining a heart rhythm and only 25 hours after initial presentation, extracorporeal membrane oxygenation (ECMO) support was started. Nevertheless, critically low blood pressure unresponsive to multiple vasopressors continued. At this point in time, a 172 mg IV bolus of MB was administered, and an infusion of MB at 0.51 mg/kg/hour was maintained for the next 10 hours. Blood pressure quickly improved and vasopressor support could be decreased. At the conclusion of the infusion, the clinical status stabilized for another 22 hours, but fever with a dropping blood pressure unresponsive to combinations of vasopressors at the highest doses returned. The MB infusion was restarted and blood pressure again responded promptly. This time the infusion was continued for 54 hours, and about seven days after this longer infusion was completed the patient was fully recovered and discharged from the hospital.

> Another impressive case report on a clinically similar patient showed that MB had to be continually infused for a full 120 hours to prevent repeated clinical relapses, after which the patient stabilized and was eventually discharged.

> These case studies, in which the patients effectively serve as their own controls, showed clear improvement on MB when severely ill, clear deterioration back to a life-threatening point after MB discontinuation, and prompt improvement with complete clinical resolution when the MB was restarted and continued for a long enough period. No sincere and

competent clinician giving his/her highest priority to patient welfare would ignore the importance of such a clinical response when treating similar patients in the future. And this is especially the case when it is realized that MB, dosed appropriately, has an impeccable safety profile, just like vitamin C.

> Also, like vitamin C, MB also enhances antibody production in the body. This begs the question: Why not use MB first in such situations, rather than last, or never? Multiple studies have demonstrated the benefits of MB in stabilizing and even resolving septic shock, which is the worst stage that any infection can reach before the inevitable progression to death. No reports of MB worsening the overall clinical status of septic patients could be found.

> The studies consistently show that MB always improves hypotension when appropriately administered. Furthermore, it has been shown that MB improves survival in shock of all causes (vasodilatory shock), including the shock of advanced sepsis. The refractory hypotension in septic shock is consistently seen in the setting of excessive nitric oxide production, which causes too great a decrease in vascular tone. MB promptly counteracts this in restoring normal blood pressure. Furthermore, over 120 years of MB use has clearly established the lack of significant toxicity. Toxic levels exist, as with nearly every other agent (including water), but the amounts needed are far beyond the recommended dosing in established treatment protocols.

> An open-minded clinician reviewing the literature for the first time to learn about the best treatment for septic shock would certainly utilize methylene blue as a first-line agent. Even low doses of MB and one-time boluses of MB consistently show clear benefits in septic shock. However, the clinical response is much better and consistently achieved with a properly-dosed continuous infusion. Septic shock still claims a lot of lives regardless of the therapy, and some clinical studies add MB seemingly as a last-ditch afterthought, after which MB is then reported to be ineffective for improving survival. And even now, some of the most recent clinical research

continues to assert that "more studies are needed" on the impact of MB in septic shock, even though the very positive research on MB and septic shock now spans decades. MB infusions in hypotensive neonates have also been shown to increase blood pressures rapidly and safely.

> The impact of MB on septic shock was addressed above in some detail since a patient cannot really be much sicker than having severe hypotension with massive infection and enormously increased oxidative stress throughout the body. However, it is important to realize that MB has also been shown to be very effective in treating different types of hypotensive shock that are unrelated to advanced degrees of infection. Shock with unresponsive hypotension secondary to the ingestion of multiple drugs has responded rapidly to MB infusions, allowing the weaning of other vasopressor agents. Shock secondary to anaphylaxis also responds well to MB.

> One patient with profound refractory hypotensive shock following a dihydropyridine calcium channel blocker overdose only responded positively to MB infusion and was eventually discharged. Prior to the MB infusion, no improvement in blood pressure was seen with saline infusion, several doses of calcium gluconate, glucagon, various vasopressor agents, and even high-dose insulin euglycemic therapy over a period of several hours. Another type of hypotensive shock, cardiac vasoplegia, is also sometimes seen following cardiac surgery. This is effectively treated by methylene blue as well. All forms of hypotensive shock should be treated with MB, and it should be part of the treatment protocol at the outset. It should not just be held back as a last-ditch intervention to save the patient.

> MB, Pathogens, and Photodynamic Therapy (PDT)
Logically, considering its documented impact on advanced septic shock, MB has also been shown to readily kill and/or neutralize a wide range of pathogens. While it can achieve this as a monotherapy, it is enhanced in effectiveness when accompanied by photodynamic therapy (PDT). A protocol using MB with PDT has even been shown to eliminate intracellular pathogens such as prions from the blood. Another MB/PDT approach has

shown rapid resolution of moderate to severe COVID in patients who did not require hospitalization. MB has been shown to directly inhibit the initial binding of the COVID spike protein with the ACE2 receptor, a step necessary for the virus to enter the cell.

> The efficacy of an inexpensive and safe agent like MB in many different and even advanced medical conditions make it an ideal general add-on or even stand-alone treatment most of the time. Furthermore, its potent anti-cancer effects in vitro make it especially puzzling why straightforward clinical studies on cancer patients with MB alone or in combination with other agents have not been reported. Even the positive effects of the much-ignored vitamin C on cancer patients have been published in many articles, yet the wonderful properties of MB have been known much longer now than vitamin C. The literature even suggests that MB could play a positive role in the treatment of cancer patients.

> MB: Safety and Dosing: The main side effect of MB is a blue / green discoloration of the urine. Rarely, some blue discoloration of the skin might be noticed when an extended administration of highly-dosed MB has occurred. Nevertheless, both effects are completely reversible in hours to a few days as the MB is eliminated out of the body. At very high doses of MB, some of the hemoglobin in the blood can be converted into methemoglobin, which is an abnormal state where MB is the treatment of choice when given at a lower dose. Even higher doses can result in greater toxic side effects, although higher doses can still be warranted for some critically ill patients who are not responding to other measures, as in terminal septic shock. Also, in patients with depression who are on drugs known as serotonin reuptake inhibitors (SSRIs), the addition of MB is not advisable, as some of these patients can develop a potentially life-threatening development known as serotonin syndrome. However, MB is an effective anti-depressant by itself at low doses.

> When administered as recommended, MB is exceptionally well-tolerated, with a safety profile that extends now over a period of more than 100 years of clinical use.

> WARNINGS: Do not take this if you are pregnant. Safety: Serotonin Syndrome (a life-threatening condition) was seen in surgeries where very high doses were administered with SSRIs, drugs that increase serotonin, and there were lethal effects. The FDA maintains a warning to not combine methylene blue with SSRI's however Mayo Clinic retracted this warning and the country of Canada has as well. Do not take with SSRIs or medicines such as MDMA, MDA, Ayahuasca, and psilocybin.

Although safe for children, this product should be kept out of the reach of children. Do not use it if the packaging is open or damaged. As with any nutrient, if you are pregnant or breastfeeding, seek the advice of a health care provider before using this product. Please know that this product can be taken safely by mouth. It is a dietary supplement by current FDA guidelines.
