MedMasters
MASTER THE ART OF HEALING

Methylene Blue

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Reasons for Training

- Protect the patient
- Protect the providers
- Protect the medicine

- Physiological understanding of therapies
- Calculating doses
- Accuracy and safety
- Competence and confidence
- Liability
- Malpractice
- Trouble shooting and critical thinking
- A+ Skills

Guaranteed Total Implementation Success

Goals

1. Expand your knowledge
2. Point you in the right direction to learn more
3. Help more patients

It is our mission to help you!

History

- **1885: From Dye to Stain**
  Scientists soon discovered another valuable use for methylene blue. Its ability to stain specific tissues made it a valuable tool for studying microbes under the microscope. This opened doors for researchers to delve deeper into the world of infectious diseases.
- **Late 1800s: Pioneering Doctor and a New Hope**
  A pivotal moment came in the late 1800s with the work of Dr. Paul Ehrlich, a German physician and Nobel laureate. He noticed that methylene blue not only stained microbes but also seemed to have a detrimental effect on them. This sparked a revolutionary idea: could a dye be used to treat infections?
- **Early 1900s: Methylene Blue as an Anti-Malarial Hero**
  Ehrlich and his colleague Paul Guttmann put the theory to the test in the early 1900s, specifically targeting malaria, a widespread and deadly disease. Their research showed that methylene blue was indeed effective in treating malaria patients. It became one of the first synthetic drugs used in medicine, a significant leap forward in the fight against infectious diseases.

History

- **Mid-1900s: Decline and Resurgence**
  The discovery of more potent anti-malarial drugs like chloroquine led to a decline in the use of methylene blue for malaria by the mid-20th century. However, recent years have seen a renewed interest in this versatile compound. Its potential benefits in treating various conditions and its low cost are making it a valuable candidate for further research.
- **The Future of Methylene Blue**
  Today, researchers are exploring the use of methylene blue for various purposes, including treating infections, boosting cellular function, and even aiding in neurological disorders. Its journey from a textile dye to a potential multi-purpose medicine continues to unfold.

SOURCES:
https://en.wikipedia.org/wiki/Paul_Guttmann#:~:text=However%2C%20this%20honor%20was%20later,blue%20had%20effectiveness%20against%20malaria
https://pubmed.ncbi.nlm.nih.gov/27576224/
https://malariajournal.biomedcentral.com/articles/10.1186/1475-2875-5-84
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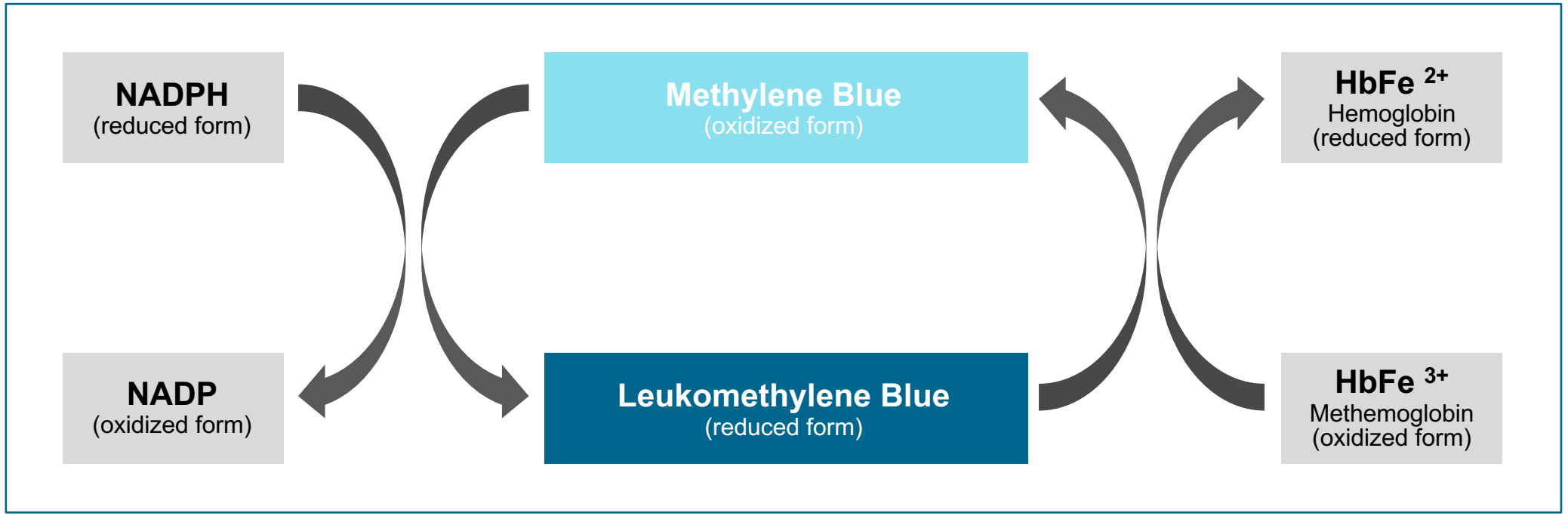

Methylene blue functions as an electron shuttle, which allows NADPH to reduce methemoglobin. This may allow one molecule of methylene blue to reduce numerous molecules of methemoglobin.

Mechanisms of Action

- **Antimicrobial Activity:**
  - In high concentrations, the oxidized form might disrupt bacterial cell membranes, affecting their function and viability.
  - Methylene blue might also interfere with essential enzymes within microbes.
- **Methemoglobin Reduction:**
  - In rare cases of methemoglobinemia, where hemoglobin can't carry oxygen properly, methylene blue can act as an electron acceptor, converting dysfunctional methemoglobin back to functional hemoglobin.
- **Mitochondrial Electron Transport Chain:**
  - Methylene blue might interact with the electron transport chain within mitochondria, potentially boosting cellular energy production.

Other Potential Benefits

- **Antioxidant Activity:** Methylene blue's ability to accept electrons might contribute to scavenging free radicals, reducing oxidative stress in cells.
- **Neuroprotective Effects:** Some studies suggest Methylene blue might play a role in protecting brain cells from damage.

Sources:
https://pubmed.ncb i.nlm.nih.gov/24556215/
https://www.mdpi.com/2073-4409/10/12/3379
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7278725/
https://pubmed.ncbi.nlm.nih.gov/20444652/

MB on NRF2

- This study suggests that Methylene Blue can activate the Nrf2/ARE pathway, a key cellular defense system against oxidative stress. Activation of this pathway leads to the production of antioxidant enzymes, which help scavenge free radicals.
- Raises NO for vasodilation and improved blood flow

Sources:
https://pubmed.ncbi.nlm.nih.gov/24556215/

MB on NRF2

This study explored the neuroprotective effects of methylene blue in cells exposed to a neurotoxin. The results suggest that methylene blue treatment:

- Activated the Nrf2/ARE pathway.
- Reduced oxidative stress and mitochondrial dysfunction caused by the toxin.
- Protected the cells from neurotoxicity

https://www.sciencedirect.com/science/article/abs/pii/S000629522100335X

This study investigated the effects of methylene blue in a mouse model of tauopathy, a condition associated with Alzheimer's disease. The researchers found that methylene blue treatment: Increased the expression of genes regulated by Nrf2/ARE pathway.

- Reduced tau protein aggregation, a hallmark of Alzheimer's disease.
- Improved behavioral abnormalities in the mice

https://pubmed.ncbi.nlm.nih.gov/24556215/

Methylene Blue Effects on Metabolism

- Increase oxygen consumption and ATP production
- Increase glucose consumption
- Increases the NAD/NADH ratio
- Decreases lactic acid production
- Is a potent antioxidant; acts similarly to vitamin E
- Inhibits monoamine oxidase (MAO)
- Acts as an alternative electron carrier in the mitochondrial electron transport chain

https://pubmed.ncbi.nlm.nih.gov/34943887/

Methylene Blue Effects on Hormones

- **Indirect Effects:** MB's potential impact on metabolism and cellular function could indirectly influence hormone regulation. For example, if MB enhances mitochondrial activity, it might indirectly affect hormones involved in energy metabolism.

***However, some studies suggest potential interactions with hormone signaling pathways:**

- **Sex Hormones:** Some preliminary research suggests MB might influence estrogen signaling in cells.
  Stress Hormones: MB's potential antioxidant activity might indirectly impact stress hormone regulation
- Inhibits prolactin
- Inhibits estrogen
- Increases thyroid hormone and lowers TSH
- Increases testosterone

https://pubmed.ncbi.nlm.nih.gov/34943887/

Photoexcitation

- When exposed to UV light, specifically wavelengths shorter than about 660 nm (visible light range), methylene blue absorbs the light energy. This excites the molecule, promoting an electron to a higher energy level. This leads to a temporary change in its electronic state and a potential color change depending on the concentration and surrounding environment.
- Some believe specific benefit for SARs

Top Benefits of Methylene Blue

1. Chemical Poisoning and Overdose
2. Anti-Malarial Drug
3. Anti-Viral
4. Dementia: Alzheimer’s and Parkinson’s
5. Cognitive Enhancement
6. Depression
7. Pain
8. Cardiovascular Health
9. Cancer
10. Cardiocirculatory Shock
11. UTI’s

MB

Methylene Blue crosses the blood-brain barrier	Doses in the 0.5mg/kg – 1.0mg/kg	In excess can be toxic. Don't exceed 200mg.
Half Life is 12 hours by urine excretion	May be helpful for bladder infections, 65mg TID for several days. It acts as an oxidant to kill bacteria.	If you inject it subcu into a melanoma or other cancer and provide red laser, it produces a photodynamic effect. It accepts the electrons from the light, throws away its electrons, produces an oxidative effect, and kills the tumor

MB Reduced Form

- You want pharmaceutical grade MB 99+% pure USP
- Commercial MB can be full of contaminants, heavy metals, etc
- MB when blue is oxidized, if you add vit c, it reduces it and it becomes clear or white
- It crosses membranes only in the reduced form
- So, taking it with vitamin c actually enhances its cycling ability

General Uses

In any process where increasing oxygen-based energy production plays a major role, methylene blue will be therapeutic

CVA, TBI, post-op, exercise, environmental toxins, all pharmaceuticals

Contradictions to Methylene Blue

- G6PD deficiency
- Infants
- SSRI's
- Severe hypertension
- Pregnancy and breast feeding

Warning
A severe and sometimes deadly problem called serotonin syndrome may happen. The risk may be greater if you also take certain other drugs. Call your doctor right away if you have agitation; change in balance; confusion; hallucinations; fever; fast or abnormal heartbeat; flushing; muscle twitching or stiffness; seizures; shivering or shaking; sweating a lot; severe diarrhea, upset stomach, or throwing up; or very bad headache.

https://www.drugs.com/cdi/methylene-blue.html
https://www.mayoclinic.org/drugs-supplements/methylene-blue-intravenous-route/before-using/drg-20064695?p=1

Protocols

For dosing, lower doses are often preferred, something around 0.5-1 mg/kg. A normal average dose infused is 30-35mg. Start at 10mg and titrate up. It is preferred to mix Methylene Blue in D5W vs. NS. One can use NS though the chlorine seems to bind/interact with Methylene Blue so D5W is preferred. If the dose is 30mg or below, it can be mixed in 100ml of D5W. If it is greater than 30mg, it is preferred to be mixed in a 250ml bag of D5W as it can be irritating to the vein.

Phase 1

10-30mg in 100ml D5W for 30 minutes assuming no vein irritation

Phase II

30-100mg in 250mL D5W for 60 minutes assuming no vein irritation

MB with UBI

Has broad spectrum virucidal activity in the presence of UV light and is effective in inactivating various viruses and blood products prior to transfusions.

Protocol:
Piggy-back MB into active IV line at port so it is exposed to UV Light before reaching the patient.

IV Resources

- NuBioAge - Rodeferin
- Tailor Made Compounding
- Vertisis – Endotoxin Free
- ProPharma: https://www.propharmausa.com/contact-us
- Project Y BioTech: info@ProjectYBiotech.com
- Rodeferin – Mitch Abrahms: https://patents.justia.com/patent/11229603

Marketing/Branding Ideas

Name Ideas:

- Azure Boost, MitoMax, CellCharge, Methylene Mojo, Blue Flame, SmurfIV

Fun descriptions:

- Feeling sluggish? Reenergize your cells from within with a Methylene Blue IV! This targeted treatment delivers a powerful dose of this natural compound directly into your bloodstream, optimizing mitochondrial function and boosting your energy levels for a revitalized you.
- Don't let feeling blue hold you back! Our innovative Methylene Blue IV goes beyond mood. This powerful treatment delivers a triple threat: fighting infections, boosting your antioxidant defenses, and supercharging your energy levels. Get ready to feel revitalized, not blue!