

THE ULTIMATE GUIDE TO METHYLENE BLUE



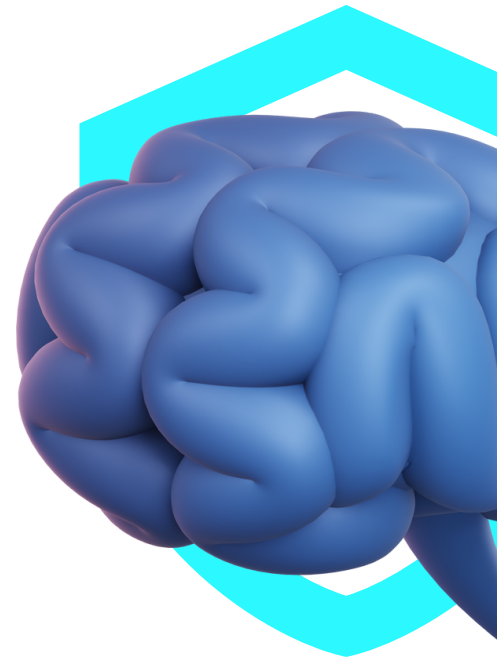
TROSCRIPTIONS TX
by Smarter Not Harder, Inc.



Disclosure

This information being provided to you is for educational and informational purposes only. It is not medical or psychological advice. Smarter Not Harder Inc. (makers of the Trocriptions brand) is not treating, preventing, healing, or diagnosing any disease or condition. This information is to be used at your own risk, based on your own judgment. It is being provided to educate you about methylene blue, mitochondrial function, nootropics, and as a self-help tool.

IF YOU COULD UPGRADE YOUR BRAIN AND PROTECT IT AT THE SAME TIME, WOULD IT BE WORTH PEEING A SHADE OF BLUE?



What if this same compound, depending on the dose, was an antimicrobial, a potential treatment for both neurodegenerative diseases (i.e. Alzheimer's, Parkinson's, etc.), improved your mood, and was possibly a treatment for the C word too?

Read on and get ready to [#blueyourself](#) because we are taking a deep dive into the history, science, and massive potential of Methylene Blue (MB).



METHYLENE BLUE HISTORY

Methylene Blue was initially developed in the late 1800s as a dye for use in textile manufacturing (fun fact: it was the dye initially [used to stain blue jeans blue](#)) but soon after it was synthesized, several medical applications were discovered, the first of which was for the treatment of [malaria](#).

MB was also used effectively as an antifungal, antiviral, and [antibacterial](#) agent before prescription antimicrobials became available in the 1950s. It is still used as an antifungal agent in [fish tank cleaners](#). More on this later but, if you are going to try MB, please (please!) don't drink fish tank cleaner and potentially win a Darwin award. [Beyond USP grade](#) (see below) is your best bet.

In the mid-20th century, MB was discovered to have antipsychotic and [mood-enhancing properties](#). It was also added to other drugs to ensure medication compliance. [Blue](#) urine? You've been taking your drugs!

Beginning early in the 20th century, and continuing to the present day, MB has regularly been used as a bacteriologic stain, a cellular stain, an indicator dye, and for surgical and medical marking.

Recently, there has been significant interest in MB because of several studies showing that it [improves learning, memory, and may be neuroprotective](#). At higher doses, it is also re-emerging as a possible treatment for various types of bacterial, fungal, protozoal, and viral infections, especially when combined with [certain spectrums of light](#).



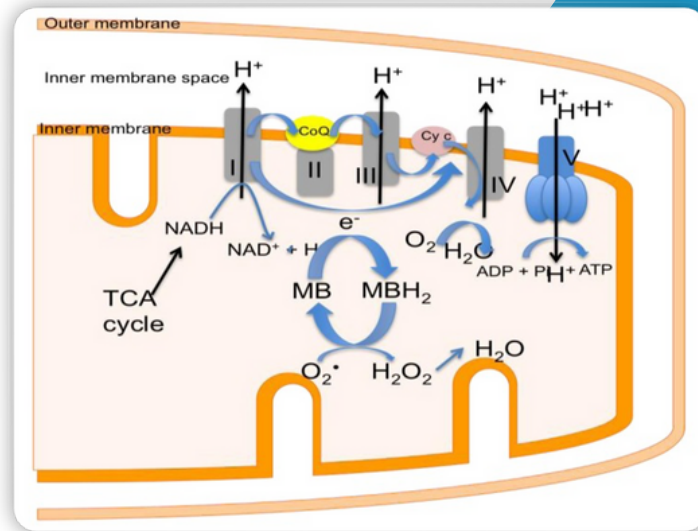
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PART 1: UNDERSTANDING THE MECHANISMS



THE MAGIC HAPPENS AT LOW DOSES

At low doses (<3mg/kg), Methylene Blue is called an **electron cyler**. It acts as an electron **donor** to the electron transport chain in your mitochondria, **increasing ATP production**.



At the same time, it also works as an **acceptor** of free electrons from reactive oxygen and nitrogen species (i.e. it works like an **antioxidant**...one as powerful as vitamin C or glutathione, in fact).

There are very few compounds that cycle electrons (i.e. donates and accepts them) as effectively as MB.

In addition, Methylene Blue also increases the cytochrome oxidase (complex IV) function in your mitochondria and drives increased glucose consumption. The latter occurs because, when the mitochondria are making more energy, they need more substrate to supply electrons to the electron transport chain.

It's important to remember that one of the major reasons we need to eat is to supply our mitochondria with electrons!

While increasing glucose consumption and energy production, MB also increases the supply of NAD+.

And there's more!

At <2mg/kg, MB causes the **release of nitric oxide** and the dilation of blood vessels so that more oxygen-rich blood flows to the area of increased glucose consumption.

For those true nerds amongst us (we are guilty), MB can bypass potentially dysfunctional mitochondrial complexes I and II. This is a big deal and a major reason why MB works to reverse or compensate for mitochondrial damage.

After absorption in the buccal mucosa (e.g. in a buccal troche at Trocriptions), oral ingestion, or IV administration, MB concentrates in tissues with the most mitochondria (e.g. the brain where it readily crosses the blood-brain barrier) the heart, muscles, the liver, and kidneys.

It is at low doses that Methylene Blue makes (**blue**) magic happen, especially for health optimization.



What happens at moderate doses?

At moderate doses ([3mg to 10mg/kg](#) in most studies), Methylene Blue becomes an [electron donor](#) *and* a [pro-oxidant](#) that facilitates the generation of singlet oxygen and peroxide radicals, especially in the presence of certain spectrums of light. This is likely the way MB works in septic shock (via nitric oxide synthase inhibition) and possibly in cancer treatment.

What happens at high doses?

At high doses ([>10mg/kg](#)), MB can have harmful oxidative effects so it should be avoided under most circumstances.

PART 2: THE BENEFITS OF LOW DOSE METHYLENE BLUE



THE TOP 8 BENEFITS OF LOW DOSE METHYLENE BLUE

1

MB donates electrons at the electron-transport chain (ETC) and increases ATP production. This effect can occur in the presence or absence of oxygen.

2

It enhances the [function of cytochrome oxidase](#) (complex IV), making it work faster and more efficiently. This leads to increased oxygen consumption and increased ATP production, especially in the most metabolically active cells, like [nerve cells in memory regions of the brain!](#)

3

MB stimulates glucose metabolism in conditions with and without oxygen + [increases the amount of NAD + produced by mitochondria](#). The greater amount of NAD+, the younger your cells remain/become due to sirtuin activation.



BENEFITS OF METHYLENE BLUE

4

MB may function as a **cholinesterase inhibitor**, increasing the amount of acetylcholine available, a neurotransmitter in the brain responsible for **arousal, attention, memory, and motivation**.

5

MB, combined with certain spectrums of light, are synergistic in **mitochondrial activation** AND may be anti-infective against bacteria, fungi, and viruses.

6

MB functions as a **powerful antioxidant** as it scavenges the mitochondria and cytosol for free electrons to accept and neutralize. On the macro level, this is how MB is neuroprotective and may reverse skin, brain, heart, and other damage.



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7

In red blood cells, MB changes the configuration of the iron (heme) in hemoglobin, the molecule in a red blood cell that carries oxygen. This improves the oxygen-carrying capacity of hemoglobin, which leads to increased ATP production from the ETC.

8

MB also has mood-lifting effects, functioning as a monoamine oxidase (MAO) inhibitor. Inhibiting MAO prevents monoamine neurotransmitter breakdown (dopamine, melatonin, and serotonin) which leads directly to increases in these neurotransmitters.





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PART 3:

DIALING IN YOUR LOW DOSING

**(DON'T GO TOO
LONG... OR TOO BIG!)**



Not all Low Dose MB is created equal!

Health
Optimization
Dosing: Very
likely
<0.5mg/kg

- Optimize mitochondrial function and enhance antioxidants reserve
- Low dose for daily/regular dosing
- Just Blue was formulated using this in mind

Disease /
Condition-
based dosing:
>0.5 to
3mg/kg

- Higher dosing for antimicrobial activity
- Must be done intermittently to prevent toxicity

At Troscriptions, our products are designed to optimize health rather than treat disease. In this context, our methylene dosing was designed to leverage this magical blue compound for its **energy-enhancing** and **antioxidant** properties while at the same time minimizing the risks of potential GI biofilm disruption and MB building up in the body due to its half-life (see below).

Our dosing also happens to be the dosing being studied in patients with neurocognitive conditions such as Alzheimer's disease (but we make no claims).

Of course, our troches (or another MB product) can be used at higher doses when needed to treat certain diseases or conditions. But, if this is the case, titration and less regular dosing are key to decreasing the risk of toxicity.





BIOFILMS

Low dose MB that is at the higher end of the low-dose range (**>1mg/kg**) and greater may disrupt natural and healthy gastrointestinal biofilms. This could lead to issues with your gut lining and gut microbiota.



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Biofilms are a collective of one or more types of microorganisms that can grow on many different surfaces. They produce a substance known as extracellular polymeric substance (EPS) that gives the surface a film-like/sticky consistency.

A fully functioning biofilm structure comprises microbial cells and EPS has a defined architecture and provides an optimal environment for the exchange of genetic material between cells of the same and different phyla, otherwise known as trans kingdom interactions.

Microorganisms that form biofilms include bacteria, fungi, and protists. In the gut, biofilms grow naturally, both at the epithelial surface and in the lumen as mucin-attached and food particle-attached colonies.





Communities of microbes that form biofilms are usually more resilient to stress and are well known to keep surfaces like your mouth and gut healthy. This includes enhancing immune-system function. They also function as a physical barrier to the intestinal lining.

There are, however, times when these biofilms can become pathologic such as in dental plaques or with certain bacterial infections. When this occurs, biofilms can actually protect pathogenic bacteria and can be difficult for the host defense system to identify.

Methylene Blue is effective at disrupting the biofilms of multiple organisms, especially when combined with other synergistic therapies, such as photodynamic therapy. For example, it is often used at doses of 50mg twice daily for infections with biofilms like Bartonella.



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Diving deeper into MB 1/2 life...

Methylene Blue--whether IV, oral, or in troche form-- is almost 100% bioavailable, meaning that almost all the MB you take in gets into your bloodstream. What's the catch? Let us explain...

How long MB stays in your body depends on its half-life. This is defined as the time it takes for one-half the amount of MB you ingested to leave your body.

The half-life of IV MB is 24 hours and the half-life of oral MB is 4 to 6 hours.

Let's take the example of 100mg oral MB dose with a half-life of 6 hours.

Imagine you took your dose at 8 am in the morning...

1/2 life #1: 50mg left in your body at 2 pm (i.e. 6 hours later)

1/2 life #2: 25mg left in your body at 8 pm (i.e. another 6 hours later)

1/2 life #3: 12.5 mg left in your body at 2 am

1/2 life #4: 6.25mg left in your body at 8 am.

This means that, if you take 100mg MB at 8 am, you'll still have 6.25mg of MB in your body 24 hours later.



As an alternate example: if we assume that the half-life is 4 hours, then there would be 3.125mg of MB left in your body at 8 am the next day.

Either way, if you take 100mg on a daily basis, MB will continue to build up in your system and there will be a high chance of eventual toxicity.

And a high dose MB (especially $>3\text{mg/kg}$) leads to mitochondrial dysfunction and inflammation, not to mention more issues with GI biofilms and your microbiota.

This is why MB, even in the low-dose range, can be toxic...and why at Trocriptions we use dialed-in, health optimization dosing.



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METHYLENE BLUE SAFETY

Methylene Blue has been used for over a hundred years and, when used with care, is an extremely safe compound.

However, it can cause toxicity at high doses ($>3\text{mg/kg}$), and even at lower doses toxicity can occur if used at too high a dose in this range or for too long. See the above info on MB disrupting biofilms and MB half-lives.

Also, combining Methylene Blue of any dose with SSRIs, SNRIs, or other drugs that prevent serotonin reuptake (including psychedelics) may cause serotonin syndrome. Please do not use methylene blue with these types of medications.

Methylene Blue is also not safe if you are pregnant, breastfeeding, or nonhuman (sorry, our furry friends).

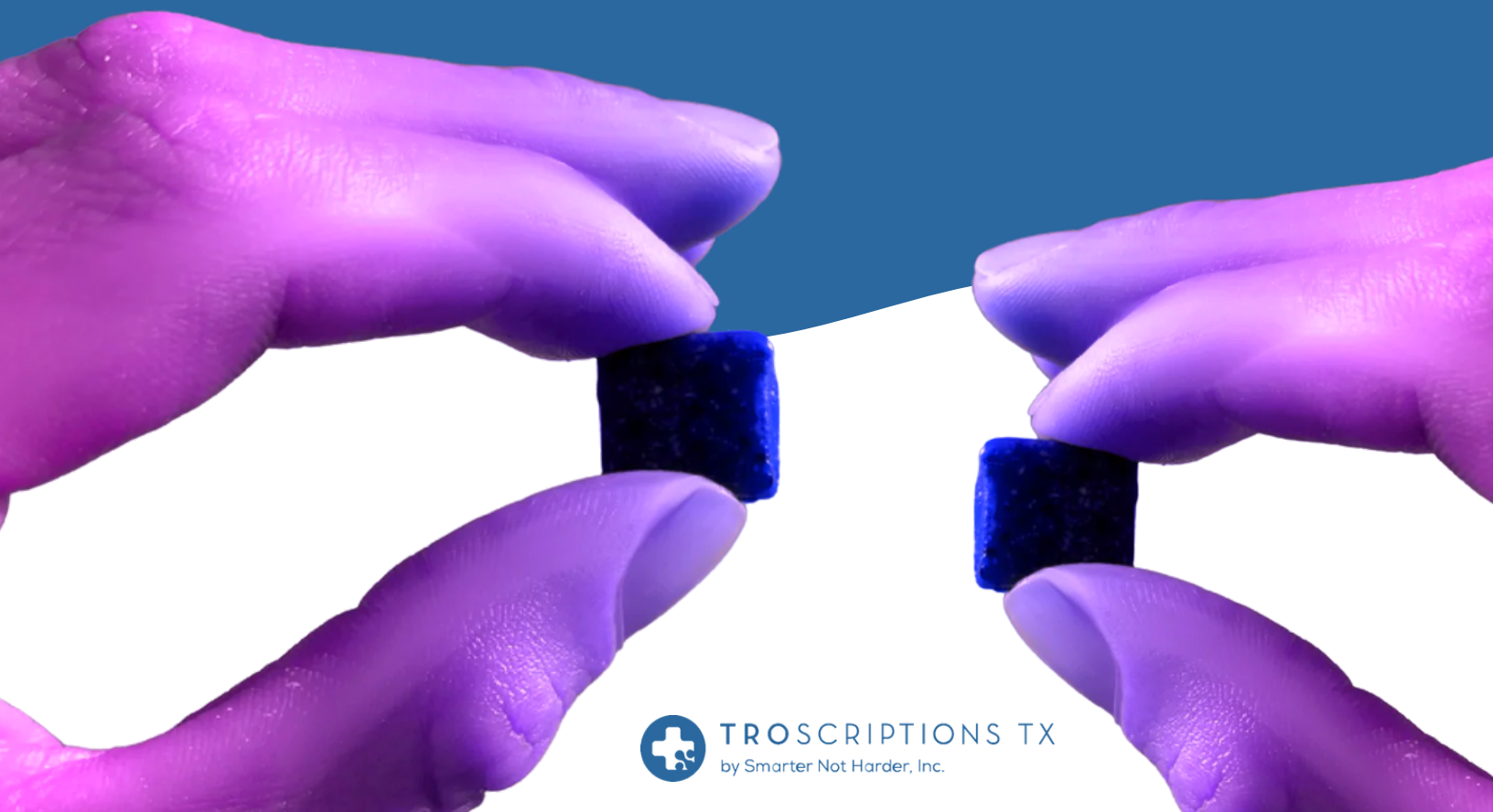
It is also not safe if you have G6PD deficiency





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PART 4: UNDERSTANDING QUALITY



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METHYLENE BLUE AS FISH TANK CLEANER?!



Prior to the invention of antimicrobials (antibiotics, antifungals, etc.) in the 1950s, Methylene Blue was commonly used in humans to treat urinary tract infections, fungal infections (including trench foot during WWII), bacterial infections, and as an antiseptic.

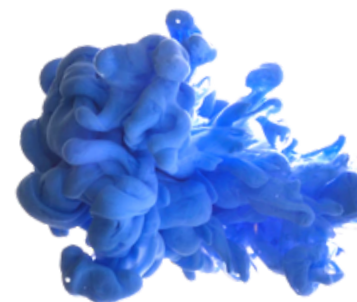
After antimicrobials were invented, however, Methylene Blue fell out of favor in humans (mostly due to its **blueness**, let's be honest) except in several emergency situations, such as in a condition called methemoglobinemia and cyanide poisoning.

However, as human use was waning, it quickly became the anti-infective of choice for aquariums where to this day it helps to diagnose and treat conditions such as egg fungus, nitrate poisoning, ammonia poisoning, velvet, stress, ick, and swim bladder disorder.

There are thousands of fish tank cleaning products that do, in fact, contain Methylene Blue...but should you drink it? Hell no! Here's why.



FISH TANK CLEANER VS. PHARMACEUTICAL-GRADE METHYLENE BLUE



There is a huge difference between the quality of Methylene Blue used in fish tank cleaners and pharmaceutical-grade Methylene Blue. Fish tank Methylene Blue is not only diluted with water to around 2% purity, it also contains a lot of impurities and heavy metals such as [arsenic](#), [aluminum](#), [cadmium](#), and [lead](#). Industrial- and chemical-grade Methylene Blue can also consist of up to 11% impurities as well.

The safest Methylene Blue for human consumption is USP (pharmaceutical-grade) Methylene Blue.

However, even USP-grade Methylene Blue can contain the aforementioned impurities. This is why it's important that the Methylene Blue you are consuming comes with documentation of purity and potency along with a USP designation (Hint: This is what we do at Trocriptions + one more vital step!).



Methylene Blue at Troscriptions

Did you know there are four practicing physicians on the Troscriptions team? And that they are emphatic that we a) sourced USP-grade Methylene Blue and b) that we tested the MB *again* with an independent lab for purity and potency before using it in our products? We call it **Beyond USP!**

This is why the launch of our company was delayed by almost a year...it took us nine months in 2019 to find a reliable source of MB that fit our criteria!

And it's just not just MB that we care about. All the products we make at Troscriptions are precision dosed, pharmaceutical grade, and physician formulated (+ clinically tested).

In addition, all our products are manufactured in a (G)ood (M)anufacturing (P)ractice facility under the supervision of a compounding pharmacist with 30 years of experience.



DOES YOUR MB COMPANY DO WHAT WE DO?



Make sure your MB company is going the extra mile to give you a pure product. Many on the market, even USP-designated products, may be contaminated with heavy metals. Industrial and chemical-grade MB should be avoided at all costs as well.

At Troscriptions our MB is:

- Third-party tested by our manufacturer to ensure purity/potency.
- USP grade
- Independently tested AGAIN for purity/potency with each troche batch we make.

Does your MB company do all this? Are they **Beyond USP** like we are?? We doubt it!

Plus, do they make easily titratable buccal troches you can titrate from 1/4 to 1/2 to a full troche as needed for health optimization?!

The pharmaceutical-grade, pure, and clear **Blueniverse** awaits you...and once you go **Buccal Troche + Beyond USP Blue**, you don't go back!

READY TO TRY METHYLENE BLUE?

Get pharmaceutical grade Methylene Blue here.

HAVE QUESTIONS?

Email
buccalup@troscritptions.com

WANT LINKS TO STUDIES?

<https://troscritptions.com/blogs/main/methylene-blue-dosing-to-optimize-health>

<https://troscritptions.com/blogs/main/sorting-out-the-fishy-headlines-on-methylene-blue>

<https://troscritptions.com/blogs/main/methyleneblue>

