

METHYLENE BLUE

An old dye with a new question.

What the evidence says about low-dose Methylene Blue - how it works in cells, what human studies show, and the safety rules that matter most.

1876

year it was first made, as a textile dye

2016

FDA approval of an IV form for a blood disorder

Low

doses behave very differently from high ones

Promising in the lab. Early in people.

Methylene Blue is one of the oldest drugs in medicine. At low doses it can pass electrons along inside mitochondria, the parts of cells that make energy. That has made it a subject of interest for memory, mood, and healthy aging.

Human studies are small and short. An IV form is FDA-approved for a rare blood disorder. Compounded Methylene Blue for wellness is not FDA-approved, and it has one serious drug interaction everyone should know.

KEY FINDINGS

- 1 An electron shuttle.** Low doses can help mitochondria keep making energy.
- 2 Dose changes everything.** Low doses and high doses can have opposite effects.
- 3 Small memory signal.** One brain-imaging study saw better short-term recall after one dose.
- 4 Not a dementia treatment.** Large Alzheimer's trials of a related drug did not meet their goals.
- 5 A serious interaction.** With many antidepressants it can cause serotonin syndrome.
- 6 Harmless but startling.** It turns urine blue or green. This is expected.

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01 *A detour around a traffic jam.*

Mitochondria make energy by passing electrons down a chain of proteins. When parts of that chain slow down, Methylene Blue can **pick up electrons** and **hand them further down the line**, keeping energy production moving.

ENERGY

Shuttles electrons

Helps the energy chain keep running when parts of it slow down.

BALANCE

Less electron leak

At low doses, may reduce the stray molecules that stress cells.

BRAIN

Crosses into the brain

Reaches brain cells, which use a large share of the body's energy.

IT ALSO AFFECTS BRAIN CHEMISTRY

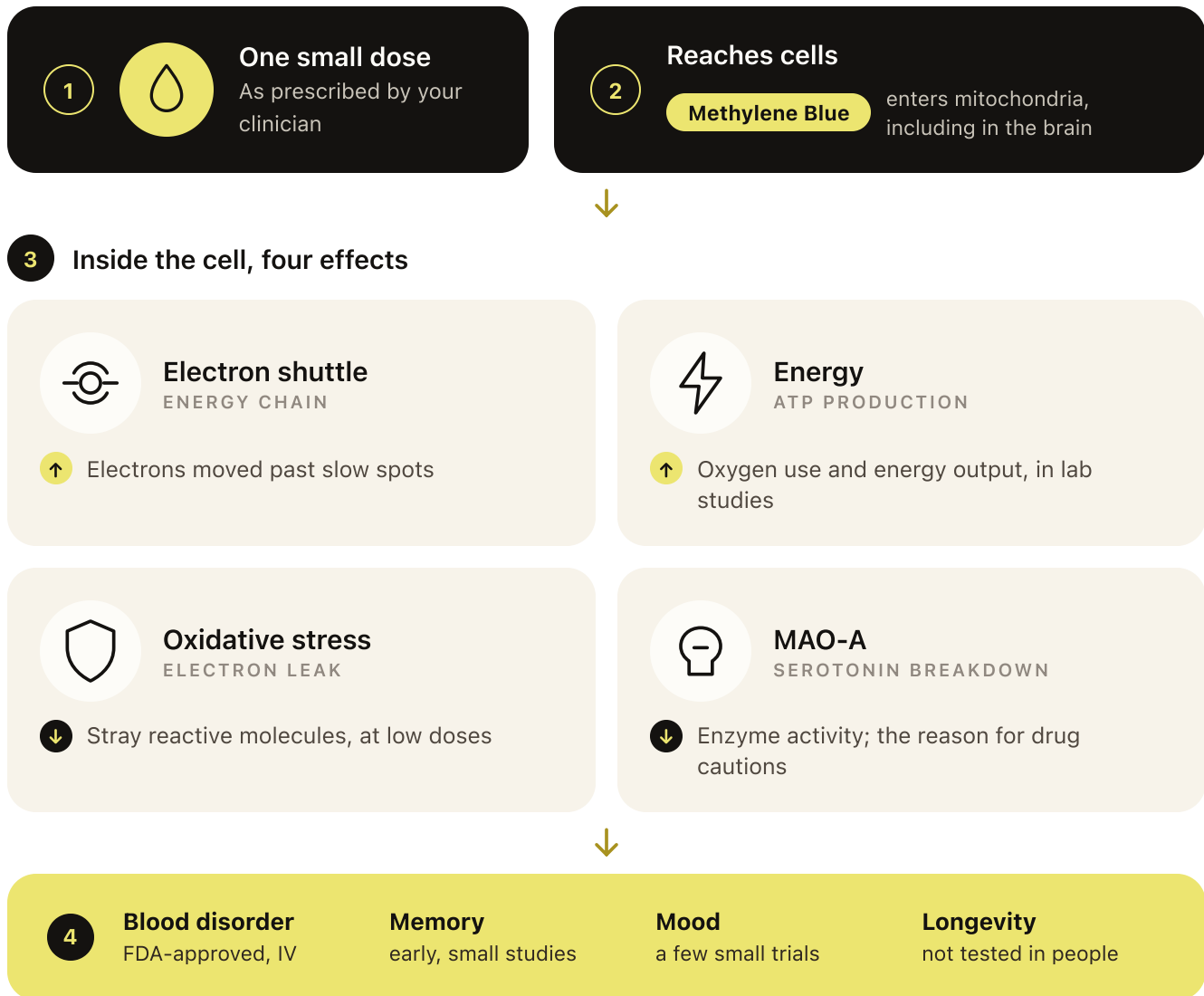
Methylene Blue blocks an enzyme called MAO-A, which breaks down serotonin. That may play a part in its effects on mood.

It is also why it can be dangerous with antidepressants and other medicines that raise serotonin. Section 04 covers this in detail.

"With Methylene Blue, less is often more, and your medicine list matters most."

The Lttl care team

From one small dose to cellular energy.

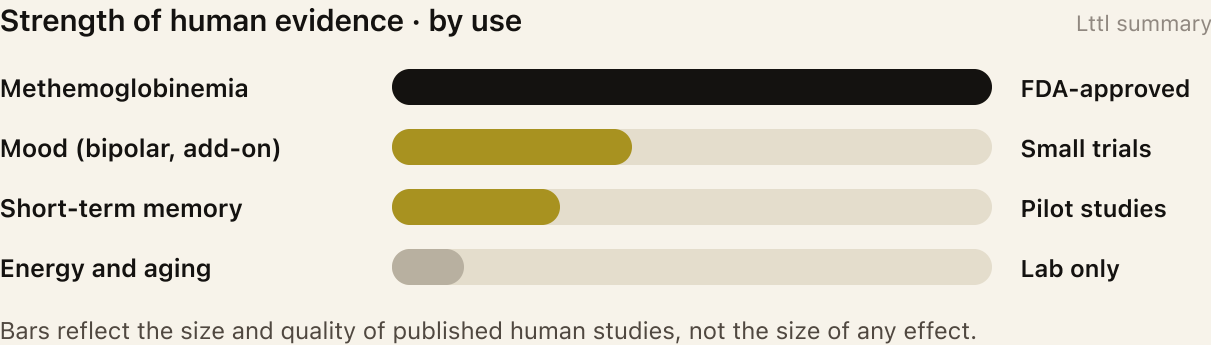


Simplified illustration. Effects vary by person and by dose. Wellness benefits of compounded Methylene Blue are not FDA-established.

02

Well proven for one use. Early for the rest.

Most of the excitement comes from lab and animal work. Human studies on memory and mood are few, small, and short.



STUDY	WHO AND WHAT	WHAT WAS FOUND
Rodriguez 2016	26 healthy adults; one low oral dose vs. placebo, with brain scans	About 7% more correct answers on a short-term memory task
Alda 2017	37 adults with bipolar disorder; added to usual treatment for 6 months	Less depression and anxiety than a very low control dose
Gauthier 2016	891 adults with Alzheimer's disease; a related compound (LMTM)	No clear benefit over control on the main outcomes
Atamna 2008	Human cells grown in the lab	Low doses raised mitochondrial activity and delayed signs of cell aging
ProvayBlue label	IV treatment for acquired methemoglobinemia	FDA-approved in 2016; carries a boxed warning for serotonin syndrome

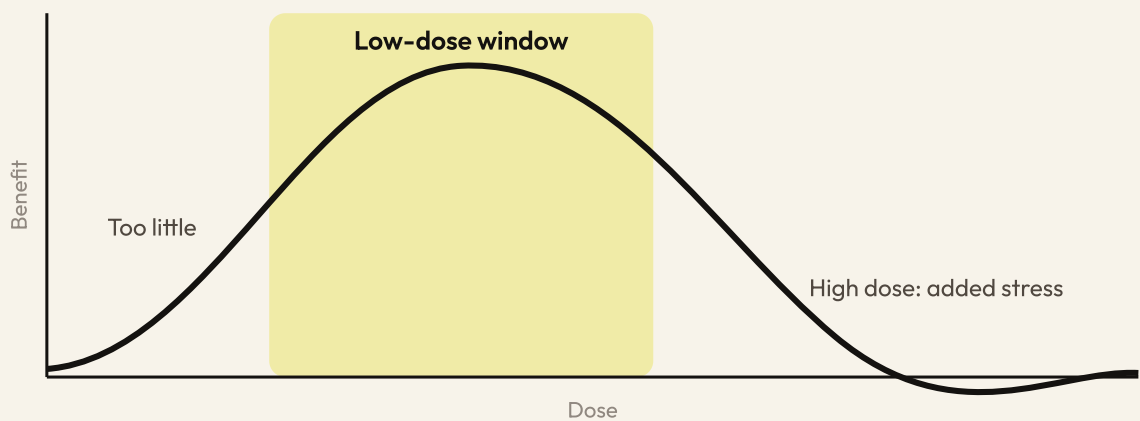
Lab findings do not always hold up in people. Long-term outcomes of low-dose Methylene Blue in healthy adults have not been established.

03 *More is not better.*

Researchers describe Methylene Blue as having a bell-shaped dose response. Low doses help cells handle electrons. High doses can do the opposite and add stress.

Benefit vs. dose · conceptual

Not to scale



Based on lab and animal research. The best dose for any one person has not been defined in trials.

	LOW DOSE (WELLNESS)	MEDICAL DOSE (IV)
Purpose	Support energy, focus, and mood	Treat methemoglobinemia in a hospital
Form	Compounded, as prescribed	Injection into a vein
Measured in	Milligrams, set by your clinician	Milligrams per kilogram of body weight
Evidence	Small, early studies	FDA-approved

QUALITY MATTERS

Industrial and aquarium Methylene Blue can contain heavy metals and other impurities. Only use **pharmaceutical-grade** product from a licensed pharmacy.

04 *Know your medicine list.*

At low doses, most side effects are mild. The biggest risk is not the dose itself but what else you take. Share every medicine and supplement with your clinician.



Serotonin syndrome. Do not combine with SSRIs, SNRIs, MAO inhibitors, or other medicines that raise serotonin unless your clinician approves. Seek care right away for agitation, confusion, fast heartbeat, high fever, sweating, or muscle stiffness.

Expected

Blue or green urine, and sometimes a blue tint to the tongue. Harmless.

Common

Mild nausea, headache, dizziness, or a stronger urge to urinate.

What helps

Take with food if your stomach is sensitive, and drink plenty of water.

NOT FOR YOU, OR TALK TO YOUR CLINICIAN FIRST, IF YOU HAVE

G6PD deficiency. Can cause serious breakdown of red blood cells. Do not use.

Kidney or liver disease. These organs clear the drug; dosing may need care.

Certain pain medicines. Tramadol, meperidine, and some others add serotonin risk.

Antidepressants or migraine medicines. Many raise serotonin; see the warning above.

Upcoming surgery. It can affect pulse oximeter readings. Tell your care team.

Allergy to any ingredient. Stop and seek care for hives, swelling, or trouble breathing.

Pregnancy and breastfeeding. Methylene Blue can harm an unborn baby and should not be used during pregnancy. Avoid while breastfeeding unless your clinician advises otherwise.

05 *Approved in the hospital. Compounded for wellness.*

ProvayBlue is an FDA-approved IV form of Methylene Blue for methemoglobinemia. Low-dose Methylene Blue for wellness is prepared by compounding pharmacies for individual patients and has not been reviewed by the FDA for that use.

	PROVAYBLUE (APPROVED)	COMPOUNDED METHYLENE BLUE (Lttl)
FDA status	Approved for acquired methemoglobinemia	Not FDA-approved; not reviewed before use
Made by	A licensed drug manufacturer	A state-licensed or FDA-registered compounding pharmacy
Prescription	Required; given in a hospital	Required, after clinician review
Dose	Based on body weight, one-time or short course	Low dose, set by your clinician
Price	Hospital billing	From \$79/mo

QUESTIONS TO ASK ANY PROVIDER

- Is it pharmaceutical grade, from a licensed or FDA-registered pharmacy?
- What is the strength, and how much is my dose?
- Have you reviewed all my medicines for serotonin risk?
- Who can I reach with questions, and when?

THE DOSING DETAIL THAT MATTERS

Methylene Blue doses are measured in milligrams, and strengths differ between pharmacies. Always confirm your dose in milligrams **and** how much to take with your care team, especially with each new refill.

06 *Subtle, if you notice it at all.*

Some people describe clearer focus or steadier energy. Many notice little. Sleep, movement, and nutrition still do most of the work.

DAY 1

Blue is normal

Urine may turn blue or green within hours.

WEEKS 1-4

Settling in

Note any headache or nausea and tell your care team.

MONTHS 1-3

Check in

Review how you feel and any new medicines.

ONGOING

Review

Reassess benefit and goals with your clinician.

HOW L TTL SUPPORTS TREATMENT

Board-certified clinicians

Licensed providers review your history and medicines before prescribing.

FDA-registered pharmacy partners

Pharmaceutical-grade, prepared by certified U.S. pharmacies.

Unlimited 24/7 support

Reach the care team any time at (888) 847-7806 or hello@lttl.com.



Where the findings come from.

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IMPORTANT INFORMATION

This whitepaper is educational and does not replace medical advice, diagnosis, or treatment. Study results describe specific populations under study conditions and may not reflect individual outcomes. Much of the research cited is from lab and animal studies. Compounded medications are not FDA-approved, and the wellness benefits of Methylene Blue are not FDA-established. Methylene Blue can cause serotonin syndrome with certain medicines and is not right for everyone; discuss your full health history and all medications and supplements with a licensed clinician before starting.

Questions? Talk to our care team.

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