



LifeBlud

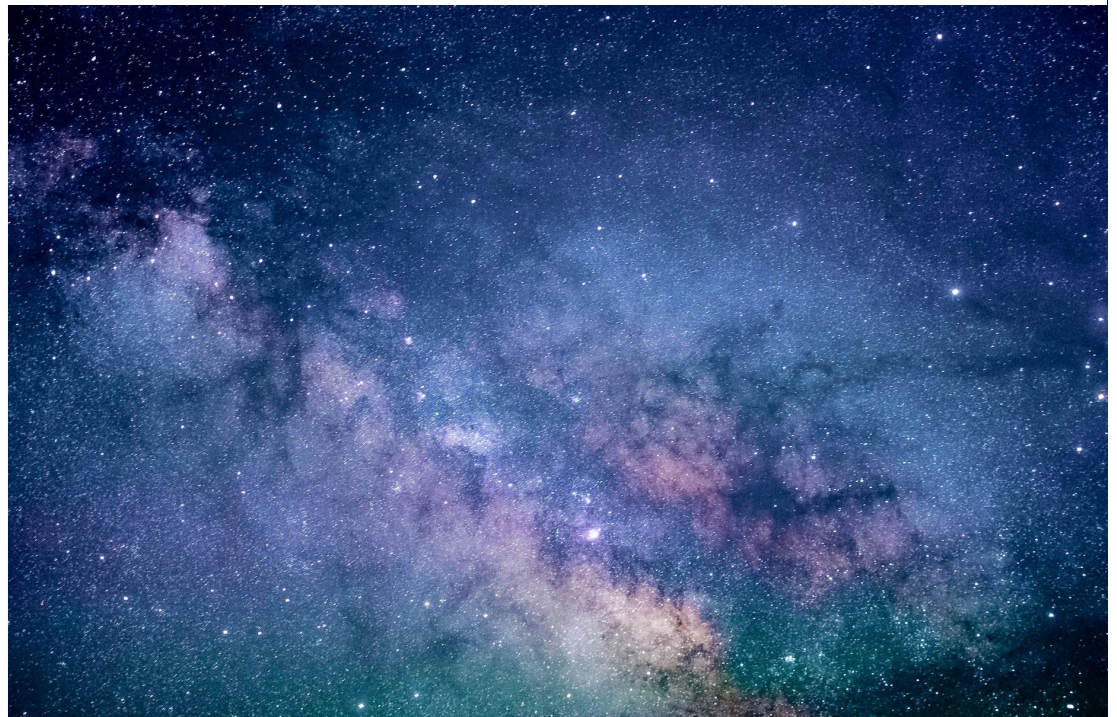
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## Methylene Blue: Swiss Army Knife

Dec 17, 2020 by Adam Marafioti [comments](#)

Methylene Blue is not meant for internal consumption and is intended for research purposes only.

Made in 1876, Methylene Blue (MB) became the first ever fully synthetic material to be used in medicine.

Initially, Methylene Blue was used as a treatment for malaria in WWII by Allied Forces, and for psychiatric disorders such as schizophrenia. But as the research continued, it was realized that MB has a seriously broad spectrum of action and benefit.

**What does Methylene Blue actually do?** Methylene Blue has the fantastic ability of being able to repair damaged tissue, cells and mitochondria, allowing them to restore proper energy function.

It restores the most proper, organized, and efficient pathway of **energy production** in the mitochondria, where oxygen and carbohydrate are consumed, and ATP, CO<sub>2</sub>, and water are created.

It specifically has its effect in the **electron transport chain (ETC)**, where it can act as a **redox agent**, meaning it can reduce itself, or oxidize itself wherever necessary. This means that it can donate electrons in the ETC where more electrons are needed, and can receive electrons when there are too many. This is a large component of its reparative effect.

By 2010, a total of **11,000** studies on MB had been published on PubMed, and the therapeutic effects are well known in the medical research community.

Still, the FDA has only recognized the use of MB for treatment of methemoglobinemia, urinary tract infection prevention, cyanide and carbon monoxide poisoning, and treatment of septic shock. For that



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I'll provide a brief list of the things that I would consider to be the marquee benefits of Methylene Blue, as well as some of the conditions it has had a positive effect on in research. After that I will leave several fascinating studies linked with a brief quote to summarize, for your own exploration and interest.

Methylene Blue:

- Broad spectrum anti-inflammatory
- Antioxidant capable of lowering oxidative stress and markers of aging
- Repairs cellular mitochondrial energy production
- Improves cellular ability to use oxygen (oxidative phosphorylation)
- Short-term, long-term and working memory improvement
- Neuroprotective
- Shown to improve depression, anxiety, psychosis, schizophrenia
- Shown to improve Alzheimer's, dementia, Parkinson's
- Promotes autophagy (the cell's garbage removal system)
- Reduces harmful Nitric Oxide
- Metabolic enhancer

Please feel free, as always, to go through the research yourself and come to your own conclusions.

Research:

**1. Common antioxidant could slow symptoms of aging in human skin**

<https://www.sciencedaily.com/releases/2017/05/170530140701.htm>

"Methylene blue improved physical, biochemical and genetic **aging markers** in experiments with human skin cells and simulated skin tissues"

**2. Methylene blue is more toxic to erythroleukemic cells than to normal peripheral blood mononuclear cells: a possible use in chemotherapy**

<https://pubmed.ncbi.nlm.nih.gov/16052340/>

"Our group has shown that MB was capable of **inhibiting the in vitro growth** of erythroleukemic cells with multidrug resistance (MDR). "

**3. Methylene blue protects dopaminergic neurons against MPTP-induced neurotoxicity by upregulating brain-derived neurotrophic factor**

<https://pubmed.ncbi.nlm.nih.gov/29882218/>

"...methylene blue (MB) is known to possess **neuroprotective** properties by reducing aggregated proteins, augmenting the **antioxidant response**, and **enhancing mitochondrial function** and survival in various models of neurodegenerative diseases."

"Our results indicate that pretreatment with MB **significantly attenuated** MPTP-induced loss of dopaminergic neurons, glial cell activation, and depletion of dopamine. We also found that MB **upregulated brain-derived neurotrophic factor** (BDNF) and activated its downstream signaling pathways, suggesting that BDNF might be a contributor to MB-associated neuroprotection"

**4. Methylene blue and its analogues as antidepressant compounds**

<https://pubmed.ncbi.nlm.nih.gov/28762173/>

"...these disorders are also characterised by **mitochondrial dysfunction** and redox imbalance. By acting as an alternative electron acceptor/donor MB **restores** mitochondrial function, **improves** neuronal energy production and **inhibits** the formation of



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#### 5. A controlled trial of methylene blue in severe depressive illness <https://pubmed.ncbi.nlm.nih.gov/3555627/>

"Improvement in patients receiving methylene blue was **significantly greater** than in those receiving placebo. Methylene blue at a dose of **15 mg/day** (3 week trial) appears to be a **potent antidepressant**, and further clinical evaluation is essential."

#### 6. Methylene blue. A possible treatment for manic depressive psychosis <https://pubmed.ncbi.nlm.nih.gov/6222095/>

"Methylene blue was given to patients who had failed to respond to standard therapies. Of the 19 manic depressives who received oral methylene blue, **14** were judged to show **definite improvement**, 3 patients in whom the diagnosis was uncertain showed no beneficial response."

#### 7. A two-year double-blind crossover trial of the prophylactic effect of methylene blue in manic-depressive psychosis <https://pubmed.ncbi.nlm.nih.gov/3091097/>

"The results of the present study suggest that methylene blue (at a dose of 300 mg/day) is a useful therapeutic addition to prophylactic lithium in bipolar manic-depressive patients, **reducing the amount of illness by almost half**" (this is an extremely high dose - research setting only)

#### 8. Neuroprotective actions of methylene blue and its derivatives <https://pubmed.ncbi.nlm.nih.gov/23118969/>

"MB retains its **protective activity** in in vivo models of stroke, Parkinson's disease, and optic neuropathy"

"MB causes an **increase** in cellular oxygen consumption and a corresponding decrease in anaerobic glycolysis (fermentation) in vitro and in vivo"

"Our study demonstrated that MB has a distinct action as an alternative mitochondrial **electron transfer carrier** and a **re-generable anti-oxidant** in the mitochondria and hence may provide neuroprotective effects for **various** neurological disorders."

#### 9. Methylene Blue in the Treatment of Neuropsychiatric Disorders <https://pubmed.ncbi.nlm.nih.gov/31144270/>

"Of interest to psychiatrists, methylene blue has **antidepressant**, anxiolytic, and **neuroprotective** properties.. Long-term use of methylene blue in bipolar disorder led to a **better stabilization** and a reduction in residual symptoms of the illness."

#### 10. Methylene blue exerts a neuroprotective effect against traumatic brain injury by promoting autophagy and inhibiting microglial activation <https://pubmed.ncbi.nlm.nih.gov/26572258/>

"Neurological functional deficits, measured using the modified neurological severity score, were **significantly lower** in the acute phase in the MB-treated animals and cerebral lesion volumes in the MB-treated animals were significantly lower, compared with the other groups at all time-points... These results indicated that MB exerts a **neuroprotective** effect by **increasing autophagy**, decreasing brain edema and inhibiting microglial activation."

#### 11. Alternative mitochondrial electron transfer for the treatment of



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<https://pubmed.ncbi.nlm.nih.gov/26603930/>

"...cancers, including glioblastoma, have increased glucose uptake and rely on aerobic glycolysis for energy metabolism. The switch of high efficient oxidative phosphorylation to low efficient aerobic glycolysis pathway (Warburg effect) provides macromolecule for biosynthesis and proliferation (pathological). Current research indicates that methylene blue, a century old drug, can receive electron from NADH in the presence of complex I and donates it to cytochrome c, providing an alternative electron transfer pathway."

"In summary, there is accumulating evidence providing a proof of concept that **enhancement of mitochondrial oxidative phosphorylation** via alternative mitochondrial electron transfer may offer protective action against **neurodegenerative diseases** and **inhibit cancers proliferation**."

### 12. Methylene blue photodynamic therapy induces selective and massive cell death in human breast cancer cells

<https://bmccancer.biomedcentral.com/articles/10.1186/s12885-017-3179-7>

"..our observations underscore the potential of MB-PDT as a highly efficient strategy which could use as a powerful adjunct therapy to surgery of breast tumours, and possibly other types of tumours, to safely increase the **eradication rate** of microscopic residual disease and thus minimizing the chance of both local and metastatic recurrence."

### 13. Inactivation of dengue virus by methylene blue/narrow bandwidth light system

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7129913/>

"Dengue virus could be completely inactivated at 2.5 m in 5 min when MB  $\geq 1.0 \mu\text{g/ml}$ . However, when the distance reached 3.0 m, only greater concentrations of MB (2.0  $\mu\text{g/ml}$ ) could **completely inactivate virus** in a reasonably short time (20 min), and smaller concentrations of MB (1.0  $\mu\text{g/ml}$ ) could only completely inactivate virus using longer times (25 min). The results of this virus inactivation model indicate that our MB/narrow bandwidth light system provides a powerful, easy way to inactivate dengue viruses."

### 14. The measurement of bioreductive capacity of tumor cells using methylene blue

<https://pubmed.ncbi.nlm.nih.gov/26603930/>

"The unique property of this drug to affect the major intracellular reductant NAD(P)H provides a mechanism for nearly total removal of cellular reducing equivalents... Therefore MB may be used for the determination of the total bioreductive capacity of cells."

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