

MB, PATHOGENS, AND PHOTODYNAMIC THERAPY

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.

MB and 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 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 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 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, and *prevents* virus entry into cells, and *inhibits viral replication* after entry into the cell.

As might be expected, the ability of MB to resolve viral 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.

There is significant research into methylene blue derivatives, which are also highly effective antiviral agents, including against viruses in the smallpox family. Similarly, as MB is of clear-cut benefit in the treatment of depression, MB derivatives are being evaluated for the treatment of depression and neurological disorders. Undoubtedly, the pharmaceutical industry recognizes the incredible abilities of MB, and much effort is going into finding related and effective agents that can be patented in order to generate astronomical profits.