MADISON MEDICAL COMPOUNDING PHARMACY

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Thank you for entrusting in the compounding services at Madison Medical Compounding Pharmacy to help meet the unique medication needs of your patients. We are excited to share our monthly newsletter with you and look forward to working with you. Please don't hesitate to let us know how we can assist you and your practice.

LeAnn Chambers, Pharm.D. and Matthew Chambers, Pharm.D.

Drug Shortages? We Can Help!

When medications are on backorder or discontinued for reasons unrelated to safety, such as declining profitability, we can often obtain the active ingredient as a pure chemical and compound the needed preparation. Compounding also enables us to remove problematic excipients such as dyes, sugar and lactose, and to customize the dose or concentration of a medication. For these reasons, patients and physicians may find that they prefer the compounded version.

Contact our compounding pharmacy if you need a medication that has been discontinued, is on backorder, or otherwise is not commercially available.

Post-Viral Illness and Mitochondrial Dysfunction

Post-viral illness refers to the persistence of symptoms or the development of new symptoms after the acute phase of a viral infection has resolved. This condition, often termed "post-viral syndrome," is characterized by fatigue, cognitive difficulties, and other lingering issues that can significantly impact quality of life. While the terms Long COVID, Post-COVID, and Long-Haul COVID have gained widespread recognition, similar post-viral syndromes can occur following infections with various other viruses.

Patients recovering from the following viruses may experience symptoms such as fatigue, pain, and cognitive difficulties long after the initial infection:

- COVID-19 (Long COVID, Post-COVID)
- Chronic Fatigue Syndrome (CFS)
- Myalgic Encephalomyelitis (ME)
- Epstein-Barr Virus (EBV)
- Cytomegalovirus (CMV)
- Respiratory Syncytial Virus (RSV)

One proposed mechanism for these lingering symptoms is mitochondrial dysfunction, although not all post-viral conditions are rooted in this dysfunction.

How Viral Infections May Lead to Mitochondrial Dysfunction
Mitochondria are essential for energy production, oxidative stress regulation, and cellular health. Viral infections can disrupt mitochondrial function in several ways:

- Chronic Inflammation and Immune Dysregulation - The immune response to viral infections often induces inflammation, which releases cytokines and other mediators. This inflammation can increase oxidative stress, contributing to mitochondrial damage.

- Oxidative Stress and Mitochondrial Damage - During antiviral responses, the production of reactive oxygen species (ROS) can harm mitochondrial DNA, proteins, and lipids, impairing their function.

- Residual Viral Components - Even after the acute infection resolves, viral particles may linger in tissues, triggering ongoing immune responses and inflammation, further stressing mitochondria.

- Compromised Blood Flow and Oxygen Supply - Viral-induced tissue damage can reduce oxygen and nutrient delivery, impairing mitochondrial function and energy production.

- Mitochondrial Membrane Permeabilization - Some viruses may directly disrupt mitochondrial membranes, releasing pro-apoptotic factors and impairing mitochondrial integrity, energy production, and cellular repair mechanisms.

Methylene blue has shown promise in addressing mitochondrial dysfunction through several mechanisms:

- Energy Production Enhancement - Methylene blue serves as an electron carrier within the mitochondrial electron transport chain, optimizing the production of adenosine triphosphate (ATP), the cell's primary energy source.

- Reduction of Oxidative Stress - With its antioxidant properties, methylene blue helps mitigate oxidative damage caused by reactive oxygen species, protecting mitochondrial integrity.

- Regulation of Nitric Oxide Pathways - By modulating nitric oxide levels, methylene blue can help restore balance in signaling pathways that impact mitochondrial function and overall cellular health.

- Promotion of Mitochondrial Biogenesis - Methylene blue may support the formation of new mitochondria, potentially enhancing overall cellular energy capacity and resilience.

Given its role in improving mitochondrial efficiency and reducing oxidative stress, methylene blue may be a valuable component of a treatment plan for patients experiencing post-viral syndromes. If you are exploring therapeutic options, our compounding pharmacy offers methylene blue tailored to individual patient needs.

If you have questions about prescribing or dosing methylene blue, our experienced pharmacists are here to assist. We also offer resources, including consultations

and personalized compounding solutions, to help optimize treatment outcomes for your patients.

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