

## Neurodegenerative and Fatiguing Illnesses, Infections and Mitochondrial Dysfunction: Use of Natural Supplements to Improve Mitochondrial Function.

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### **ABSTRACT**

**Background:** Many chronic diseases and illnesses are associated with one or more chronic infections, dysfunction of mitochondria and reduced production of ATP. This results in fatigue and other symptoms that occur in most if not all chronic conditions and diseases.

**Methods:** This is a review of the published literature on chronic infections in neurodegenerative diseases and fatiguing illnesses that are also typified by mitochondrial dysfunction. This contribution also reviews the use of natural supplements to enhance mitochondrial function and reduce the effects of chronic infections to improve overall function in various chronic illnesses.

**Results:** Mitochondrial function can be enhanced by the use of various natural supplements, notably Lipid Replacement Therapy (LRT) using glycerolphospholipids and other mitochondrial supplements. In various chronic illnesses that are characterized by the presence of chronic infections, such as intracellular bacteria (*Mycoplasma*, *Borrelia*, *Chlamydia* and other infections) and viruses, LRT has proven useful in multiple clinical trials. For example, in clinical studies on chronic fatigue syndrome, fibromyalgia syndrome and other chronic fatiguing illnesses where a large majority of patients have chronic infections, LRT significantly reduced fatigue by 35-43% in different clinical trials and increased mitochondrial function. In clinical trials on patients with multiple intracellular bacterial infections and intractable fatigue LRT plus other mitochondrial supplements significantly decreased fatigue and improved mood and cognition.

**Conclusions:** LRT formulations designed to improve mitochondrial function appear to be useful as non-toxic dietary supplements for reducing fatigue and restoring mitochondrial and other cellular membrane functions in patients with chronic illnesses and multiple chronic infections.

**Key words:** Neurodegenerative and fatiguing illnesses, infections and mitochondrial dysfunction, ATP, Lipid Replacement Therapy (LRT)