



A Primer on Chronic Fatigue Syndrome

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By Courtney Craig

Chronic Fatigue Syndrome, or CFS, is a serious illness with a terrible name.

CFS has been described as the flu that never goes away. Throughout the rest of CFS is more accurately named Myalgic Encephalomyelitis, or ME. Many patient clinicians have now adopted the combined term ME/CFS, with the belief that Chronic Fatigue Syndrome has the potential to cause harm to patients (1). Lab this diagnosis, patients are frequently dismissed from doctor's offices under a cloud, or erroneously told to exercise back to health. However, the defining characteristic of ME/CFS that differentiates it from other conditions, **depression** included, is exertional malaise. A simple bout of mental or physical activity can trigger flu-like symptoms in patients with lasting effects.

Imagine a trip to the mailbox being enough to confine you to bed for the rest of the day ... or longer.

Despite growing numbers stricken -1 million Americans – research funding for disease has remained paltry for nearly 3 decades. Many in mainstream medicine do not accept the illness as organic, and all too often malign it with psychosomatic conversion disorders. Worse still, many patients are not accepted by family or loved ones.

Is it any wonder then that a leading cause of death in this group of patients is suicide?

Fatigue alone does not even begin to describe what a patient with ME/CFS experiences on a daily basis. Lack of understanding leads to onlookers assuming laziness, depression, or simply over-work. Yet, the fatigue felt has been compared to the fatigue experienced by end-stage cancer or HIV/AIDS patients. Severely debilitating symptoms afflict those with the illness: cognitive problems, pain, irritable bowel syndrome, autonomic dysfunction, sleep disturbance ... the list goes on. The larger impact of the illness is that disability due to ME/CFS is estimated to cost \$9.1 billion in lost productivity every year in the US (3).

Research has not been able to pinpoint the exact cause or trigger for ME/CFS. A clear diagnostic marker remains elusive. However, many unique physiological signals have been identified.

been determined. As an example, abnormal cytokine and immune cells are hall findings (3). Certain cytokine patterns are thought to drive sickness behaviors contribute to hypersensitivity to pain. Most patients also have limited natural cell number and function. This finding may be associated with increased rates **cancers** in patients as well as harboring of opportunistic infections. Finally, patients have limited cardiopulmonary capacity and blood flow irregularities. These findings explain the intolerance to exercise and depressive symptoms due to poor cerebral perfusion (4,5).

Is It Autoimmune?

While not classically defined as an **autoimmune disease**, there are striking similarities between ME/CFS and conditions such as **Multiple Sclerosis**. In fact, as many as 30% of patients have a comorbid autoimmune diagnosis (6). The chronic or recurring infections common in many patients can induce autoimmunity by molecular mimicry and bystander activation (6). Similar to autoimmune conditions, viruses can flip the switch on the immune system leading to loss of “self” recognition. Others note the onset of illness following a vaccination, suggesting an autoimmune (auto-inflammatory) syndrome induced by adjuvants (7).

Is It In The Cells?

Many ME/CFS patients mind their mitochondria — the vitally important energy house of the cell. Numerous studies have demonstrated mitochondrial insufficiency in ME/CFS patients which is likely due to a vicious cycle of oxidative stress (8, 15). Inflammatory cytokines and other immune cells propagate reactive oxygen species that damage cell membranes, myelin, and mitochondria. As a consequence, studies have noted depleted **CoQ10** in patients suggesting mitochondrial dysfunction. This finding supports the epidemiological evidence that ME/CFS patients are more prone to **cardiovascular diseases**, since CoQ10 is vital for heart health. Some reports have shown that congestive heart failure can occur 25 years earlier in ME/CFS patients than in the general population (8).

Is It In The Brain?

Advanced imaging studies in ME/CFS found widespread neuroinflammation in key brain regions including the cingulate cortex, hippocampus, amygdala, thalamus, midbrain, and pons. Inflammation in these areas was 45%-199% times higher in ME/CFS patients than in healthy controls. Interestingly, the degree of neuroinflammation correlated with symptom severity (9). Larger studies are underway to determine if a specific inflammatory marker is driving the vicious cycle of inflammation. At the moment,

are on leptin. Leptin measured daily in a small cohort of patients was found to correlate with the degree of neuroinflammation. This inflammatory molecule released from adipose tissue, can activate microglia in the brain which promotes neuroinflammation.

Still other studies have shown that ME/CFS patients have reduced white matter abnormalities in gray matter, potentially offering additional clues to explain the difficulties and brain fog patients endure. Lastly, a recent study showed reduced Derived Neurotrophic Factor (BDNF) in ME/CFS patients that was far greater than healthy patients suggesting an obstacle in neurogenesis and plasticity (11).

Is It In The Gut?

Acclaimed virus hunter Dr. Ian Lipkin has launched a crowd-funded project to study the microbiome in ME/CFS. Putting aside the idea of viral etiology, Lipkin and his team at Columbia hope to find a unique dysbiotic signature in these patients (<http://www.microbediscovery.org/>). An exciting 2013 study in Belgian and Norwegian patients, found altered intestinal microbiota that may be linked to the pathogenesis of the illness (13).

Other researchers are also thinking about the role of the gut in this illness. A September paper from 2014 proposed that the latent viral infections harbored by ME/CFS patients can have major effects on cognitive function due to translocation via the vagus nerve. Could it be that viruses or bacteria harbored in the digestive tract of ME/CFS patients can exert effects on the brain using this cranial nerve as passageway?

How To Intervene

Just because ME/CFS remains a medical mystery should not suggest patients have no options for symptom relief. Without a FDA-approved medication for the illness, patients look to integrative and functional medicine doctors to manage their symptoms. With the information currently available, evidenced-based interventions can be applied.

It Starts With Food.

Undoing the cycle of inflammation can be best addressed by starting with an anti-inflammatory diet. This may provide modest relief of pain or fatigue in many patients. A nutrient-dense diet also provides abundant cofactors to promote energy production at the cellular level. Gut healing dietary strategies can also be utilized to ensure intestinal integrity and immune function. Many patients eliminate known gut irritants such as **gluten**, dairy, **alcohol**, and refined sugars (14).

Smart Supplementation

Seldom is diet alone sufficient to make a substantial impact on severe ME/CFS patients rely on a suitcase of supplements with the hope of finding the right combination. While research is slim in this arena, evidence grows for the need mitochondrial nutrients as well as basic vitamin and mineral cofactors (15). Or showed significant improvement with just 2 months of supplementation with vitamin/multi mineral (16).

Immune boosting nutrients are commonly utilized to support a healthy immune response, prevent viral reactivation, and improve NK cell function. These include nutrients as transfer factors, medicinal mushrooms, and **curcumin** (17). Anti-inflammatory nutrients are also indicated including omega 3 oils, **vitamin D**, and antioxidants like **resveratrol** and EGCG.

Mind and Body

Few can relate to the hopelessness that comes from living with a chronic illness decades. Patients wrestle with the bleak reality that they may never completely. Finding hope through healthy attitudes and habits is of vital importance for the patients. Learning to say no, allowing adequate time for rest, and carefully pacing throughout the day are the norm for a patient with ME/CFS (4). Cultivating acceptance and practicing mindfulness provide other tools patients can use to cope. Mind meditation is now accepted as a practice that can impact brain health and reduce physiological stress response. Mind-body practices help many patients achieve sleep and promote a deeper level of healing.

Editor's note: this excellent review did not identify the role of retroviruses in CFS syndrome. For a deeper appreciate for their role in the pathogenesis of CFS/ME book **Plague, or listen to Greenmedinfo.com founder Sayer Ji's interview of its author Judy Mikovits, PhD, on **Fearless Parent Radio**.**

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First diagnosed with Chronic Fatigue Syndrome at age 16, my academic and career trajectory was fueled by the constant need to understand and overcome the illness. My clinical training at Palmer College of Chiropractic, Florida, completed an undergraduate study in exercise science at the College of William and Mary and I am currently a nutrition Diplomate candidate through the American Clinical Board of Nutrition.

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