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**Prevalence in the Cerebrospinal Fluid of the Following Infectious Agents in a Cohort of 12 CFS Subjects: Human Herpes Virus-6 and 8; Chlamydia Species; Mycoplasma Species; EBV; CMV; and Coxsackievirus**

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**ABSTRACT.** Over the last decade a wide variety of infectious agents has been associated with the chronic fatigue syndrome (CFS) as potential etiologies for this disorder by researchers from all over the world. Many of these agents are neurotrophic and have been linked previously to other diseases involving the central nervous system (CNS). Human herpes virus-6 (HHV-6), especially the B variant, has been found in autopsy specimens of patients who suffered from multiple sclerosis.

Because patients with CFS manifest a wide range of symptoms involving the CNS as shown by abnormalities on brain MRIs, SPECT scans of the brain and results of tilt table testing we sought to determine the prevalence of HHV-6, HHV-8, Epstein-Barr Virus (EBV), cytomegalovirus (CMV), Mycoplasma species, Chlamydia species, and Coxsackie virus in the spinal fluid of a group of 12 patients with CFS. Although we intended to search mainly for evidence of actively replicating HHV-6, a virus that has been associated by several researchers with this disorder, we found evidence of HHV-8, Chlamydia species, CMV and Coxsackie virus in 6/12 samples.

Attempts were made to correlate the clinical presentations of each of these patients, especially the neurological exams and results of objective testing of the CNS, with the particular infectious agent isolated. It was also surprising to obtain such a relatively high yield of infectious agents on cell free specimens of spinal fluid that had not been centrifuged. Future research in spinal fluid analysis, in addition to testing tissue samples by polymerase chain reaction (PCR) and other direct viral isolation techniques will be important in characterizing subpopulations of CFS patients, especially those with involvement of the CNS.

**KEYWORDS.** HHV-6, HHV-8, cerebrospinal fluid, PCR, chronic fatigue syndrome

**INTRODUCTION**

The chronic fatigue syndrome (CFS) is characterized by the following symptom complex: debilitating fatigue, low grade fevers, myalgias, neurocognitive difficulties, and sleep disorders (1,2). Over the last several decades researchers have implicated a number of infectious agents as potential etiologic causes (3-6) of this rather perplexing disorder because over 60% of patients report the onset of their fatigue following an acute viral infection (7). Herpesviruses (8,9), enteroviruses (5), and

Chlamydia species (10) have also been shown to invade the central nervous system, which is probably affected in at least a subpopulation of CFS patients as shown by studies employing brain magnetic resonance imaging (MRI) (11); single photon emission computed tomographic (SPECT) scans (12,13); and results of testing involving the hypothalamic pituitary axis (14).

We sought, based on results of other researchers in this area ( 15,16), using PCR testing methodology performed in 2 separate laboratories, to determine the prevalence of the following infectious agents in the cerebrospinal fluid of 12 CFS subjects: human herpes virus-6; human herpes virus-8; CMV; EBV; Mycoplasma species; Coxsackie species; and Chlamydia species.

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