



### **Cardiac dysfunction resulting in CFIDS due to EBV and/or CMV infection**

There are a number of studies indicating that an Epstein-Barr (EBV) and/or cytomegalovirus infection of the heart muscle can decrease the heart's ability to pump and may be the cause of CFIDS in a number of patients. A rapid resting heart rate can be a sign that this is a problem. Studies also indicate that when the EBV and CMV infections are eradicated, there is significant or complete resolution of the symptoms of CFIDS.

Many CFIDS/FM patients have been found to be infected with active EBV and/or CMV infections, especially those with rapid heart rates. When these infections are eradicated, the patient can have tremendous improvement and his or her heart rate declines. Many patients are told that they do have these infections but that they are not treatable. These are, however, very treatable infections. It is important to note that just treating EBV, without treating the CMV co-infection, does not result in improvement.

#### **These were some of the first studies documenting abnormal heart function in patients with CFIDS.**

Lerner AM, Lawrie C, Dworkin HJ. Repetitively negative changing T-waves at 24-h electrocardiographic monitors in patients with the Chronic Fatigue Syndrome (left ventricular dysfunction in a cohort). *Chest*. 1993;104:1417-1421.

Dworkin HJ, Lawrie C, Bohdiewicz P and Lerner AM. Abnormal left ventricular myocardial dynamics in eleven patients with the Chronic Fatigue Syndrome. *Clinical Nuclear Medicine* 1994;19:675-677.

Lerner AM, Goldstein J, Chang CH et al. Cardiac involvement in patients with Chronic Fatigue Syndrome as documented with Holter and biopsy data in Birmingham, Michigan, 1991-1993. *Infectious Diseases in Clinical Practice* 1997;6:327-33.

#### **These are some of the studies demonstrating that the abnormal heart function is due to EBV and/or CMV infection and has nothing to do coronary heart disease.**

Lerner AM, Zervos M, Dworkin HJ, Chang, CH and O'Neill W. A unified theory of the cause of Chronic Fatigue Syndrome. *Infectious Diseases in Clinical Practice* 1997;6:230-243.

Lerner AM. Editorial response: microbial persistence and idiopathic dilated cardiomyopathy. *Clinical Infectious Diseases*. 1999;29:526-7.

#### **These are some of the studies demonstrating that eradication of the EBV and CMV infection results in significant improvement in heart function and resolution of the symptoms of CFIDS.**

Lerner AM, Zervos M and Dworkin HJ et al. New cardiomyopathy: A pilot study of intravenous ganciclovir in a subset of the Chronic Fatigue Syndrome. *Infectious Diseases In Clinical Practice* 1997;6:110-117.

Lerner AM, Zervos M and Chang CH et al. A small, randomized, placebo-controlled trial of the use of antiviral therapy for patients with Chronic Fatigue Syndrome. *Clinical Infectious Diseases*. 2001;32:1657-58.

Lerner AM, Beqaj SH, and Deeter RG et al. A six-month trial of valacyclovir in the Epstein-Barr virus subset of Chronic Fatigue Syndrome: improvement in left ventricular function. *Drugs of Today*. 2002;38:549-561.

Lerner AM, Beqaj SH, Deeter RG and Fitzgerald JT. IgM serum antibodies to human cytomegalovirus nonstructural gene products p52 and CM2 (UL44 and UL57) are uniquely present in a subset of patients with Chronic Fatigue Syndrome. *In Vivo*. 2002;16:153-160.