

Challenges in the analysis of multifaceted data sets to understand complex disorders

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Chronic fatigue syndrome (CFS) is a debilitating, multi-symptom illness including fatigue, cognitive impairment and pain. People with CFS have no diagnostic clinical signs or laboratory abnormalities, and the etiology and pathophysiology remain unknown. CFS represents a complex illness that includes alterations in homeostasis, affects multiple body systems and results from the combination of environmental factors, risk-conferring behaviors and the action of many genes. In order to achieve understanding of complex illnesses, such as CFS, relevant epidemiological, clinical and laboratory data must be collected and then integrated, analyzed and interpreted so as to obtain meaningful clinical and biological insight.

A large population based study performed by the CDC of persons with CFS, culminated in a 2-day in-hospital survey of several hundred participants. This included people with CFS, other medically and psychiatrically unexplained fatiguing illnesses and non-fatigued controls. The clinical, genomic, genetic and proteomic data collected during that study was provided to CAMDA for the 2006 competition. In 2007 further genetics data and processed proteomic data was added to the data set and used for the current competition.

This presentation will discuss the datasets provided in the context of data integration and multidisciplinary collaborations, which we hope will lead to novel approaches for exploring large multifaceted datasets. This in turn will bring understanding to complex illnesses such as CFS. There is hope that the new tools of genomics, proteomics and genetics will help in studying disorders, allowing us to dissect the multiple factors that interplay in the presentation of disease. Our current challenge is how to integrate this data into biologically meaningful answers.