

## Brain Power

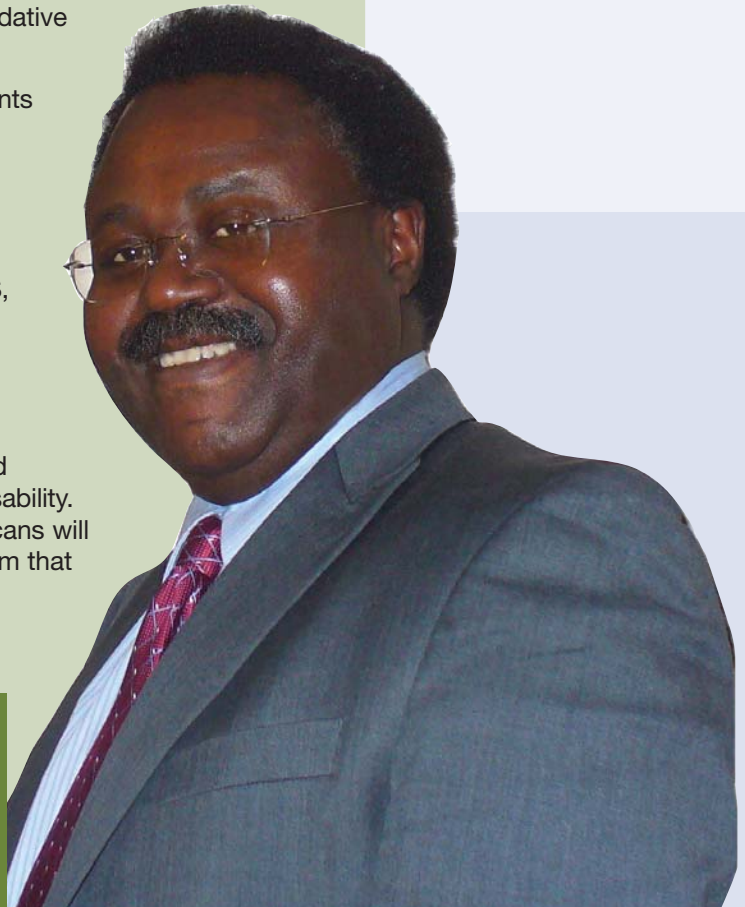
**Dikoma Shungu, PhD**, an established scientist in neuroimaging and neurometabolism, has been training his sights on the brain metabolism of CFS patients since he received a grant from the CFIDS Association in 2006. And what he's found has been remarkable.

In that initial study Shungu and his team used a brain scanning technique called magnetic resonance spectroscopy (MRS)—which not only provides a picture of the brain but also detects levels of various brain chemicals important to metabolism (energy transformation), including creatine, N-acetylaspartate, choline and lactate. Astoundingly, the results indicated as much as 348% higher lactate levels in the brain fluid of CFS patients than in that of the healthy control subjects. These findings were published in October 2008 in the journal *NMR in Biomedicine*.

The new award from the Association will allow Shungu's team to verify the results of the earlier study by examining a larger group of CFS patients and comparing results to a disease control group of depressed study subjects. It'll also enable the scientists to explore the reason for the elevated lactate levels. According to Shungu, "We want to determine whether lactate levels are higher in the CFS patients because their brains contain high levels of toxic compounds that cause oxidative stress, which could implicate chronic inflammation, or because mitochondrial dysfunction is causing a malfunction in their brain energy production." (See the feature on oxidative stress on page 10.)

This research is significant because it represents the first comprehensive attempt to establish the brain mechanisms that might be going wrong in CFS. According to one leading brain imaging expert who reviewed Shungu's grant application, if this subsequent study finds such high elevations of lactate in another set of people with CFS, then it would be very hard for science or the medical establishment to ignore that something is very physiologically wrong with these patients.

The objectivity of the brain scan results could also be important in establishing occupational disability. If Shungu's earlier results are confirmed, these scans will provide objective evidence of a metabolic problem that indicates an incapacitating level of fatigue.



**Dikoma Shungu, PhD**

**Study:** MR neuroimaging assessment of cerebral metabolic substrates and regional blood flow in CFS

**Institution:** Weill Medical College of Cornell University

**Collaborators:** Sanjay Mathew, MD, Benjamin Natelson, MD