Correspondence

Oxidative Stress and Prion Diseases

A recent article in the *Journal of the American Medical Association* presented an overview of the risk of bovine spongiform encephalopathy ("mad cow disease") to humans. Of particular interest was a discussion of a possible "infectivity threshold."[1] Oxidative stress—the relative imbalance of free radicals to antioxidants–may be a factor influencing the infectivity threshold of individuals and the subsequent progression of spongiform encephalopathies.

Many diseases, including schizophrenia, Alzheimer's and other neurodegenerative diseases, are strongly influenced by and may even be caused by oxidative stress. Oxidative stress can aggravate diseases through free radical damage to cell structures and processes, e.g., membranes and mitochondrial bioenergetics, and through alterations in cellular communication and DNA expression.

Two small and noteworthy—but generally overlooked—cell-culture experiments have explored the role of free radicals and antioxidants in prion diseases. In one, prion-stimulated microglia released large numbers of free radicals, which killed neurons through oxidative damage. Vitamin E and N-acetyl cysteine (NAC) blocked prion-initiated neurotoxicity.[2] In another experiment, NAC reduced oxidative stress by 50 percent in astroglial cells exposed to human prion proteins.[3] The protective role of vitamin E and NAC is further supported by studies that have found these nutrients to have antiviral and immune-enhancing properties.[4,5]

Although the human variants of spongiform encephalopathies, such as Creutzfeldt-Jakob, appear to be irreversible, it is conceivable that their progression may be accelerated by oxidative stress. It is also possible that high levels of antioxidants might slow the progression of spongiform encephalopathies, just as vitamin E slows the progression of Alzheimer's disease. This is an area that warrants further research and clinical application. There is little to lose since Creutzfeldt-Jakob disease is rapidly terminal.

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ods with a patient or their healthcare professional, your name and number can be listed as a resource professional.

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Publication of the first OMRD is targeted for early 1998. Please send your submissions to:

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