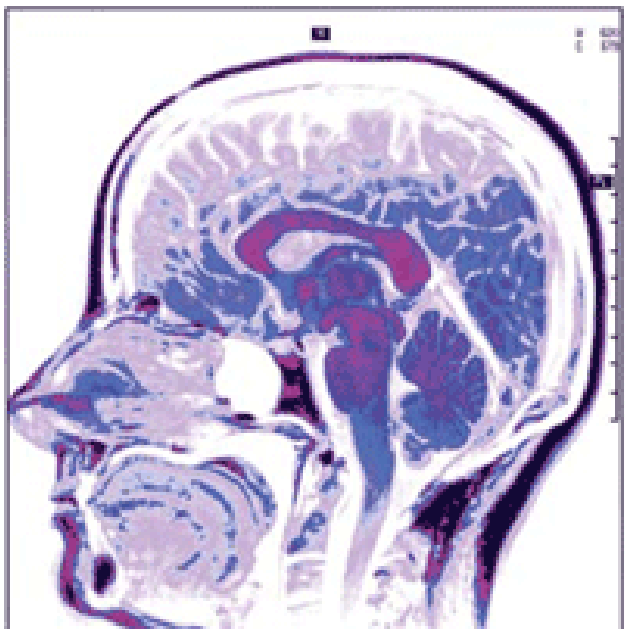


Caring for the Aging Brain

by Dan Moran, Ph.D.

Brain health is becoming a greater concern in the United States, as the country's population ages and faces degenerative health conditions.



Science has shown most age-related brain diseases, like Alzheimer's disease (AD), amyotrophic lateral sclerosis (ALS) and Huntington's cause cellular damage in remarkably similar ways. Although the cause of many brain diseases remains unknown, the loss in brain energy metabolism and the increases in oxidative damage are shared factors commonly associated with brain aging.^{3,4} There are two major hypotheses bearing heavily on the science of brain aging in general. One theory focuses on the

neurodegenerative processes caused by imbalances in cellular calcium homeostasis.⁵ The other theory is based on the health and vitality of the cell's energy factory, the mitochondrion.^{6,7} The theories are related, since imbalances in cellular calcium regulation cause mitochondrial dysfunction, and mitochondrial dysfunction can contribute to cellular calcium imbalance.⁸

As mentioned previously, mitochondria convert glucose into chemical energy in the form of ATP, a compound that drives chemical reactions and maintains the nerve cell's ability to carry impulses. As glucose is converted to ATP, free radicals are generated that, over time, age the mitochondria by damaging its genetic material, destroying membranes and fouling protein metabolism. This sets the stage for age-related brain diseases like AD.^{9,10,11,12,13} Without antioxidant support, neurons slowly decay, cells die and the brain ages. The result is a decline in thought process and coordination of movement.

Research has shown the health of the brain can be directly affected by a diet rich in antioxidants.^{14,15,16} Mitochondrial decay due to oxidative damage can be prevented or delayed through proper diet and nutritional supplements.^{17,18} Deliberate and consistent intake of mitochondrial nutrients (mt-nutrients) can protect mitochondrial enzymes, decrease free radical damage and help maintain and repair the mitochondrial membrane.¹⁹ Antioxidants obtained from a diet of colored fruits and vegetables, berries and nuts as well as supplements of vitamin E, C, coenzyme Q10, green teas, ginsengs and the B vitamins have been proven to reduce mitochondrial decay and slow brain aging and age-related cognitive decline.^{20,21,22}

In many studies, intake of acetyl-L-carnitine and lipoic acid reduced and, importantly, repaired the oxidative damage done to the mitochondria.^{23,24,25,26} Most polyphenols and saponins (from plants as well as vitamins, micronutrients and minerals that support mitochondria) are small molecules that easily absorb into the gut and circulate easily into the brain—a very important feature in the purchase of brain health products.

Brain health is an imminent concern for the aging population. The supplement industry can make a major impact on the quality of health for those who care and are well informed.

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The graying of the population cannot be denied, with a baby boomer turning 50 every seven seconds, and nearly 77 million aging adults spending their health care dollars on nontraditional means.¹ One of the greatest health concerns is preventing brain degeneration; however, caring for the brain requires an understanding of its needs. The brain is a demanding organ, requiring 20 percent of the body's energy and up to 25 percent of the heart's blood flow.² In each of the 100 billion cells that make up the brain is an energy factory known as the mitochondrion; the neuronal mitochondria turn glucose into chemical energy in the form of adenosine triphosphate (ATP). Around 50 percent of the cellular energy is required to charge and recharge the membranes of neurons. Charged membranes are like high-voltage batteries. When they discharge, an electrical signal is transmitted, and movement, thought, memory or sensory input (pain or sight) is created. Anything that interferes with the energetics of the cell will impinge on the health of the brain.