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Life Extension Update Exclusive

Findings support contribution of oxidative stress to brain aging

An article published online on November 27, 2005 in the journal *Nature Neuroscience* reported that a protein found in mice and humans appears to help protect nerve cells from oxidative stress. Oxidative stress has been associated with neurodegenerative diseases such as Parkinson's and Alzheimer's disease and can be reduced by antioxidants such as glutathione. Because the brain uses a large amount of oxygen and contains a relatively high amount of lipids, it is particularly vulnerable to oxidative stress and the damage it can cause.

Chief of neurology and rehabilitation services at San Francisco's Veteran's Administration Medical Center, Raymond Swanson, MD and his colleagues at the VA and University of California, San Francisco found that, in mice, excitatory amino acid carrier-1 (EAAC3 in humans), which is expressed by neurons as a glutamate transporter, can also rapidly transport the amino acid cysteine, which is necessary for the synthesis of glutathione within the nerve cells. Dr Swanson has called glutathione the most important brain antioxidant.

Dr Swanson's team observed that mice bred to lack EAAC1 developed increased brain atrophy and behavioral changes at 11 months compared to normal mice of the same age. Examination of the brains of these mice found reduced neuronal glutathione and increased oxidant levels, as well as ten times the susceptibility to oxidant injury compared to mice that produced EAAC1.

When the mice lacking EAAC1 were given N-acetylcysteine (NAC) five hours before their brains were examined, the glutathione content of the neurons was normalized. By its ability to cross lipid membranes, N-acetylcysteine was able to provide cysteine to cells that lacked cysteine transport, thereby enabling them to synthesize glutathione. Additionally, neurons from mice treated with NAC showed greater oxidant-scavenging capacity compared to untreated mice.

Dr Swanson commented, "It's known that neurons don't take up cysteine directly, and it's never been clear exactly how it gets there. This study provides the first evidence that EAAC1 is the mechanism by which cysteine gets into neurons – and that transporting cysteine is probably its chief function."

Although he finds the concept "appealing," but difficult to prove or disprove, Dr Swanson stated that the results "support the idea that oxidative stress contributes to aging" in the brain. "This certainly adds credence to the idea," he observed.

Protocol

Age-associated mental impairment

Neurological diseases such as dementia manifest most commonly in the elderly. The good news is that many of the underlying reasons for why people experience memory loss and other neurological disturbances are correctable. Any one or a combination of the following factors can cause age-associated cognitive dysfunction:

- The damaging effects of chronic inflammation causing injury to both cerebral blood vessels and neurons (brain cells).
- Changes in lifestyle and diet leading to nutrient deficiencies (e.g., many older people become deficient in critical nutrients).
- Hormonal imbalances and decreased levels of key hormones, especially DHEA, estrogen, testosterone, etc.
- Decreases in oxygen available to brain cells because of impaired circulation due to pathology (e.g., atherosclerosis or heart disease) or a lifetime of poor health habits (e.g., smoking, drinking, bad diet, or stress).
- Declining energy output of brain cells.
- Essential fatty acid deficiencies (the brain is composed almost entirely of fatty acids).
- The damaging effects of chronic free radical exposure.
- Adverse side effects from prescription medications.
- Elevated levels of MAO (monoamine oxidase).
- Reduced levels of neurotransmitters such as acetylcholine.

Age-associated mental impairment can be treated safely and effectively with memory-enhancing nutrients, hormones, and drugs. These therapies improve cerebral circulation; boost brain cell metabolism; stabilize brain cell membranes; increase acetylcholine; provide structural building blocks to neurons; synchronize brain cell interaction; restore youthful hormone balance; suppress free radicals; and reduce chronic inflammatory processes.

The benefit of taking several different types of agents that protect and enhance neurological function is that these same agents can also prevent age-associated diseases from manifesting in other parts of the body. Nutrients such as coenzyme Q10, acetyl-L-carnitine, and ginkgo, along with hormones such as DHEA, melatonin, and testosterone, can provide dramatic systemic anti-aging effects. A massive body of published scientific research indicates that one can take steps to boost cognitive function today, while simultaneously reducing the risk of Alzheimer's disease, stroke, and other degenerative brain diseases.

<http://www.lef.org/protocols/prtcl-003.shtml>

Featured Products



N-acetylcysteine

N-acetylcysteine is the more efficiently absorbed and used form of the amino acid, L-cysteine. L-cysteine plays a role in the sulfation cycle, acting as a sulfur donor in phase II detoxification and as a methyl donor in the conversion of homocysteine to methionine. N-acetylcysteine has antioxidant properties, and helps to maintain healthy levels of the liver's natural detoxifier, glutathione.

<http://www.lef.org/newshop/items/item00215.html>



Cognitex with NeuroProtection Complex

Cognitex has been reformulated and changed from a softgel to a hard capsule to take advantage of new developments and ingredients for cognitive health. The previous Cognitex formulas provided premium levels of phospholipid nutrients (GPC and PS), vinpocetine and pregnenolone (option). This has been maintained while adding "next generation" nutrients and more vinpocetine for advanced brain protection.



The brain is a highly active organ that produces high levels of free radicals from normal metabolism. These free radicals can bombard the fatty membranes of neurons and other brain cells causing premature loss of function. Cognitex contains a number of phytonutrient-based antioxidants that work best in a lipid (fat) rich environment like the brain.

<http://www.lef.org/newshop/items/item00805.html>

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