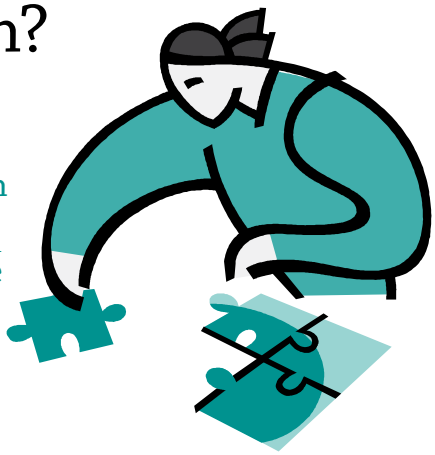
Acetyl L-Carnitine, Cholesterol & Dementia

What's the Connection?



by Mike Smith, PhD, MDSc

There is mounting evidence of a connection between Alzheimer's disease (AD) and cardiovascular disease (CD).[1] A common risk factor for late onset of AD is the presence of a special form of the apolipoprotein E (ApoE), the E4 form, which is known to be intimately involved in cardiovascular and cerebrovascular disorders.

The *normal* type of ApoE is responsible for the transport and metabolism of cholesterol and triglycerides into cells. This action promotes the healthy metabolism of cholesterol by the liver. In the brain, ApoE helps build and repair normal neuronal (nerve cell) processes.[2] However, the E4 form of ApoE seems to *increase* production of brain amyloid-β (Aβ) burdent – the key protein found in AD patients. It does this by interrupting the normal repair process, while other forms of ApoE appear to be protective of neurons.[3]

We now seem to have an overall understanding of a connection between high cholesterol levels and AD. So by trying to reduce our risk to cardiovascular disease by lowering our cholesterol, we are also improving our chances of avoiding AD and probably other dementias.

It seems good advice for avoiding AD and other dementias would be to keep our cholesterol levels in check. A method which many physicians use to aid people to lower blood cholesterol is to liberally prescribe statin drugs. While these drugs conveniently and successfully lower cholesterol levels, like many drugs long-term use comes with a price. Statin drugs effectively interrupt the biosynthesis of cholesterol but at the same time they all remove our ability to biosynthesize CoQ10.

We all know that CoQ10 is required for the proper function of mitochondria which is the portion of our cells which produces energy from foods and oxygen. The result is that while the patient receives some long-term benefit of lower cholesterol with statins, many people suffer significant muscle pain and weakness which must be offset by daily taking CoQ10.[4] There may be another way around the dilemma of taking statin drugs and subjecting the patient to both the positive effects of lowering cholesterol and the negative symptoms of muscle pain and weakness.

There is new evidence from the cutting edge of medicine that acetyl L-carnitine and L-carnitine (we shall refer to all forms of L-carnitine as simply carnitine) both lower blood cholesterol and can retard the appearance of old age forgetfulness and indeed some types of dementia. There are now several clinical studies indicating the benefits of oral carnitine for the elderly[5] and the ill. In general, researchers observed that carnitine improved both the strength and the mental acuity of the aging subjects. The conditions reported include diabetes[6], obesity and renal failure and positive results from carnitine supplementation were observed even when the subjects were on statin treatment.

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The key to understanding the positive effects of carnitine is to realize this small biochemical is biosynthesized in only small amounts in humans. Yet it is required by all cells for the transport of lipids, including triglycerides, from the cell interior into the inner space of mitochondria where lipids are oxidized to liberate energy. Fully oxidized lipids are important sources of useful energy for cells – muscle cells and neurons in particular.

If people become overweight or suffer a long-term debilitating condition, such as increased levels of triglycerides, cholesterol and low density lipoproteins (ApoE), then the body should aid lipid and cholesterol oxidation by increasing the blood level of carnitine. However, most of us are incapable of

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responding to these additional stresses by synthesizing additional carnitine. So the best most of us can do for ourselves to prevent AD is to add acetyl L-carnitine and other nutrients which also fight cardiovascular disease, such as α-lipoic acid and CoQ10, to our daily nutritional supplementation.

References

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Mike Smith PhD, MDSc, has advanced studies in biochemistry, physiology and medicine. Dr. Smith has co-authored more than 30 scientific and medical articles in journals and lectured extensively. He has designed many new diagnostic tests for clinical use. Dr. Smith became interested in nutritional supplements after reading Linus Pauling and while doing research on oxygen and carbon monoxide toxicities.

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Acetyl L-Carnitine Research

Fibromyalgia & Pain

A multicentered randomized clinical trial tested the effectiveness of acetyl L-carnitine (ALC) for fibromyalgia (FMS) symptom relief. 102 participants who met the American College of Rheumatology's FMS criteria received ALC daily for 2 weeks as follows: 500 mg by capsule or placebo plus 500 mg ALC by injection or placebo. Then patients took either 500 mg ALC or placebo orally for 8 additional weeks. Findings included significant decline in tender points and "total myalgic score" until week 6; "statistically significant" improvement of muscle pain and depression symptoms in only the ALC group was noted at week 10. Researchers conclude that ALC "may be of benefit in patients with FMS, providing improvement in pain as well as the general and mental health of these patients." Source: *Clin Exp Rheumatol* 2007 Mar-Apr;25(2):182-8

Fatigue & Cognition in ME/CFS

In an open randomized study, 30 patients received 2 grams daily of amino acids used to treat ME/CFS; acetyl L-carnitine (ALC), propionyl-L–carnitine (PLC) or a combination. Dutch researchers looked for measurable improvement in fatigue, pain and concentration. Scores were taken before, during and at the 24-week study end plus 2-weeks post treatment; and effects rated by clinical change. Other measurements included a fatigue inventory, pain questionnaire and attention concentration test. Both ALC and PLC groups found improvement with fatigue and concentration. Neither group reported decreased pain. Only the ALC group showed plasma carnitine level change correlating with 1) clinical improvement, and 2) significant improvement specifically for mental fatigue. Source: *Psychosom Med* 2004 Mar-Apr;66(2):276-82

Antioxidants as drug treatment for Alzheimer's

Age-related dementias including Alzheimer's disease (AD) seem to respond well to a few specific antioxidants including acetyl L-carnitine (ALC). University of Texas at San Antonio researchers state the link between AD and vascular disorders such as ischemia, inflammation and oxidative damage is due to reactive oxygen species (ROS). The ROS is believed to induce mitochondrial damage. This causes cell injury and death during normal aging, leading to a gradual decline in cellular antioxidant defense mechanisms. Oxidative damage can accelerate ROS. A potent antioxidant, ALC can target these factors that damage mitochondria and reverse the effects. Source: *CNS Neurol Disord* Drug Targets 2011 Mar;10(2):149-62

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