

Acetyl-L-Carnitine

What does it do? Acetyl-L-carnitine (ALC) is similar in form to L-carnitine, a vitamin-like compound, and also has some similar functions, such as being involved in the metabolism of food into energy. Besides cellular energy production, ALC has become a central focus in neurodegenerative disease research. The acetyl group that is part of acetyl-L-carnitine contributes to the production of the neurotransmitter acetylcholine, a critical player in nerve/muscle communication, concentration, memory, and learning. In fact, acetylcholine is so central to mental function that the leading pharmaceutical drugs used for senility are aimed at elevating its levels in the brain. ALC supplementation can improve general metabolism in many organ systems, including the nervous system, and may improve mental function by enhancing membrane stability, energy production, and nerve transmission. In addition, ALC may also have anti-inflammatory effects that reduce the generation of free radicals in the body.¹

Several double-blind clinical trials suggest that acetyl-L-carnitine delays the progression of cognitive decline.^{2,3} In one double-blind study in Italy, 236 elderly patients with mild senility were given either 1,500 mg ALC or placebo. The ALC group showed significant improvements in memory and cognition compared with controls.⁴

Where is it found? Acetyl-L-carnitine is a molecule that occurs naturally in the brain, liver, and kidney. It is formed in the mitochondria when L-carnitine joins an acetyl group from acetyl CoA. It is also available as a dietary supplement. Animal foods are the only sources of L-carnitine. We can also synthesize carnitine, provided enough L-lysine (an amino acid) is present.⁵

What Does the L-Mean? The *L* forms of these nutrients (carnitine or acetyl-carnitine) are the most biologically active forms, and are the only forms found in foods and synthesized by the body. When carnitine is chemically synthesized, both the *L* and *D* forms are produced. Although supplements generally contain the *L* form, be sure to avoid ones containing the *D* form,⁵ as they have been shown to interfere with the action of the natural L-carnitine.⁶

Who is likely to be deficient? Acetyl-L-carnitine levels may decrease with advancing age.

How much is usually taken? Most research involving acetyl-L-carnitine uses 500 mg three times per day, though some research uses double this amount.⁷

Are there any side effects or interactions? Acetyl-L-carnitine is safe, although skin rash, increased appetite, nausea, have been reported in individuals taking acetyl-L-carnitine.^{8,9}

¹ Standberry, Jill, N.D. Sustain Your Brain. *Delicious* 2001.

² Pettegrew JW, Klunk WE, Panchalingam K, et al. Clinical and neurochemical effects of acetyl-L-carnitine in Alzheimer's disease. *Neurobio Aging* 1995;16:1-4.

³ Sano M, Bell K, Cote L, et al. Double-blind parallel design pilot study of acetyl levocarnitine in patients with Alzheimer's disease. *Arch Neurol* 1992;49:1137-41.

⁴ *La Clinica Terapeutica*, 1990, vol. 132, no. 6

⁵ Lieberman, Shari, Ph.D. *The Real Vitamin and Mineral Book 2nd Ed.* Avery Publishing. Garden City Park, NY. 1997.

⁶ Watanabe, SW et al. Effects of L- and DL-carnitine on patients with impaired exercise tolerance. *Japanese Heart Journal* 36: 319-331; 1995.

⁷ Monograph—Acetyl-L-Carnitine. *Altern Med Rev* 1999;4:438-41 [review].

⁸ Thal LJ, Carta A, Clarke WR, et al. A 1-year multicenter placebo-controlled study of acetyl-L-carnitine in patients with Alzheimer's disease. *Neurology* 1996;47:705-11.

⁹ Rai G, Wright G, Scott L, et al. Double-blind, placebo controlled study of acetyl-L-carnitine in patients with Alzheimer's dementia. *Curr Med Res Opin* 1990;11:638-47.