



DO ANTI-AGING SUPPLEMENTS REALLY WORK?

Consumers take dietary supplements for a variety of reasons. Some only seek to avoid acute deficiency or reduce their risk of degenerative disease. A growing number of users, however, expect that certain supplements will help to slow aging.

Those who believe that supplements may retard aging base their reliance on scientific studies demonstrating specific mechanisms of action. Examples are the anti-glycating properties of carnosine, the methylation-enhancing effects of folic acid and the ability of fish oil to suppress pro-inflammatory cytokines.¹⁻¹³

Another basis for these anti-aging theories is that certain supplements replace what was naturally produced in youth. For instance, low levels of DHEA and melatonin are associated with a host of age-related disorders.¹⁴⁻²⁵ Restoring these hormones to youthful ranges has produced promising results.²⁶⁻⁴²

Critics of anti-aging supplements remain unconvinced. They demand proof that ingestion of these supplements actually deters biologic aging.

The National Academy of Sciences has published three new reports showing that aging may be partially reversible with currently available supplements. These new reports corroborate previous findings indicating that we already have some control over how aging affects us.

Restoring cell function

In the first study published by the National Academy of Sciences⁴³, young and old rats were supplemented with acetyl-l-carnitine and lipoic acid for up to one month before their death. The results showed a partial reversal in the decline of mitochondrial membrane function while consumption of oxygen significantly increased. This means that acetyl-l-carnitine and lipoic acid improved cellular metabolic function. The improvement was substantially greater in old rats compared to young rats.



We know that aging results in the decline of the ability of cells to generate energy. This impairment is caused by the failure of the mitochondria—the cell's energy factory. Aged cells also generate more damaging free radicals (oxidative stress), even though less oxygen is consumed.

Since acetyl-l-carnitine and lipoic acid cause aged cells to produce more energy, a logical question to ask is whether more toxic free radicals are being generated. Remember, when energy is produced in the mitochondria, a byproduct is oxidative stress (excess free radical formation). Young cells contain natural antioxidants such as glutathione to control free radical reactions, but aged cells are vulnerable because they are deficient in endogenous antioxidants. This new study showed that the combination of lipoic acid and acetyl-l-carnitine reduced a marker (malondialdehyde) of free radical damage.

Another way of ascertaining whether older cells are able to resist free radicals is to measure their vitamin C levels. The findings of this study showed that the combination of acetyl-l-carnitine and lipoic acid restored vitamin C levels in the livers of old rats to those seen in the young rats.

What may impress skeptics most about this study is that the combination of acetyl-l-carnitine and lipoic acid improved ambulatory activity, with a significantly greater degree of improvement in the old rats compared to the young ones.

Human aging is characterized by lethargy, infirmity and weakness. We now have conclusive evidence that supplementation with two over-the-counter nutrients can produce a measurable anti-aging effect.

Reversing memory loss

The second study published by the National Academy of Sciences evaluated the effects of supplemental acetyl-l-carnitine and lipoic acid on the brains of old rats.⁴⁴ The scientists evaluated cognitive function, mitochondrial structure and markers of oxidative damage in these old rats.

In two different types of cognitive tests, supplementation with acetyl-l-carnitine and lipoic acid resulted in improved memory. Electron microscopic studies in the hippocampus region of the brain showed that acetyl-l-carnitine and lipoic acid reversed age-associated mitochondrial structural decay.

The brains of the aged rats showed the expected increase in oxidative damage, but supplementation with acetyl-l-carnitine and lipoic acid protected against much of this free radical attack. The conclusion of the scientists who conducted this study was:

“These results suggest that feeding acetyl-l-carnitine and lipoic acid to old rats improves performance on memory tasks by lowering oxidative damage and improving mitochondrial function.”

A hallmark consequence of aging is a decline in mental function. This study confirms a mechanism by which age-associated cognitive impairment and mitochondrial structural dysfunction can be controlled.

Protecting mitochondrial “fuel”

In the third National Academy of Sciences study,⁴⁵ scientists tested acetyl-l-carnitine and lipoic acid to see if



an enzyme used by the mitochondria as biologic fuel could be restored in old rats. The name of this enzyme is carnitine acetyltransferase.

As expected, old rats had low levels of this enzyme compared to young rats. However, after seven weeks of supplementation with acetyl-l-carnitine and lipoic acid, levels of carnitine acetyltransferase were significantly restored in the aged rats. Supplementation also inhibited free radical-induced lipid peroxidation.

The scientists concluded that feeding old rats acetyl-l-carnitine and lipoic acid can ameliorate oxidative damage, along with enzyme and mitochondrial dysfunction.

Where we stand today

There is more anti-aging research being conducted today than at any other time in history.

Some scientists are optimistic that significant breakthroughs are on the horizon. Other experts disagree and want more resources allocated to finding a cure for aging. We prefer to err on the pessimistic side and battle for more money to be spent on controlling aging in our lifetime.

The Life Extension Foundation is the largest scientific organization dedicated to eradicating the miseries of human

aging. We fund millions of dollars for pioneering research each year. Every time you buy a product from us or renew your membership, you help support our goal of breaking down the genetic barriers that put a finite limit on how long we can exist.

In this issue of *Life Extension* we report on several anti-aging discoveries, some that Foundation members can take advantage of today!

For longer life,



William Faloon

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