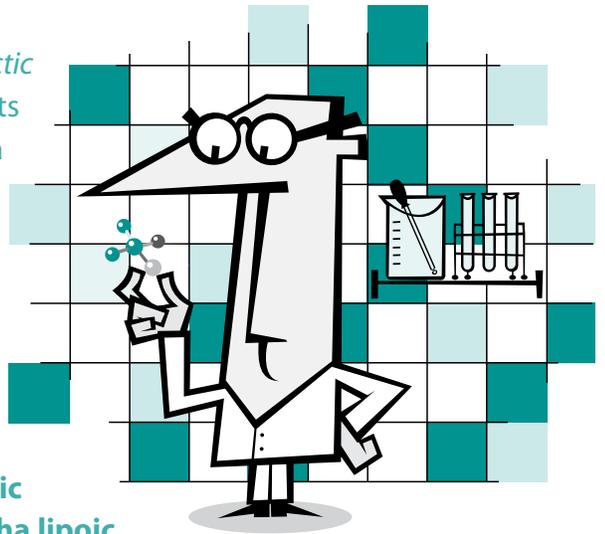


Alpha Lipoic Acid

Aiding the Treatment of Diabetes

by Michael Smith PhD, MDSc

Alpha lipoic acid (ALA) or *α*-lipoic acid or thioctic acid is a small molecule found as only trace amounts in common foods. There seems to be very little alpha lipoic acid in fruits and veggies with perhaps none in processed grains. It might be most concentrated in the liver over any other organ, but it took extraction from several tons of liver to first isolate just a few grams of alpha lipoic acid. Because some humans, but only youngsters, can biosynthesize enough *α*-lipoic acid for health, this important molecule is not listed as a vitamin by ultraconservative bureaucracies such as the US FDA. **However, most adults past 40 cannot biosynthesize *α*-lipoic acid and we cannot eat enough meat to obtain sufficient alpha lipoic acid.** Hence one might call *α*-lipoic acid an acquired vitamin like vitamins C and E; older adults simply require dietary *α*-lipoic acid to remain healthy.



Alpha lipoic acid is often touted as an exceptional antioxidant for several reasons.

1 It is quite easily digested with the vast majority of ingested *α*-lipoic acid passing the intestinal barrier into the blood stream.

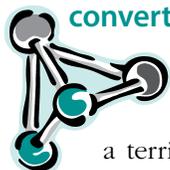
2 Being a very powerful antioxidant, ALA is one of the biochemicals responsible for quickly regenerating other anti-oxidants, such as vitamins C and E.

3 ALA is also directly responsible for returning damaged DNA, proteins, enzymes and cell structures (outer membranes and intercellular structures) back to the unoxidized, functional forms.

Though all of these claims have scientific support, the antioxidant functions of alpha lipoic acid are not thought to be critical for humans, especially those taking care of themselves via good diet and nutritional supplementation with C and E.

Alpha lipoic acid – like most biomolecules – has a preferred geometric form as *R*-lipoic acid, which is the form utilized by several enzymes critical for converting fats into energy.

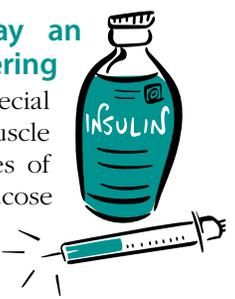
While alpha lipoic acid is readily available as a dietary supplement (as synthetic alpha lipoic acid); it is the 50-50 combination of the R and S forms. This is not a terrible drawback, but means that one must take



more of the dietary supplement than if it was all natural, since only 50% of the dietary supplement seems to be biologically active. Pure R-lipoic acid is available but quite expensive and all one must do to ensure adequate intake is to take plenty of the readily available and much cheaper R and S mixture.

Alpha lipoic acid is a safe dietary supplement. The recommended daily dose for diabetes is 600 mg, taken 2 or 3 times a day as either 200 or 300 mg capsules. Most people can tolerate a 1200 mg daily dose, though very few people can develop non-serious side effects. These minor side effects disappear quickly by cutting back on alpha lipoic acid supplementation.

Alpha lipoic acid seems to play an important and direct role in countering diabetes. Insulin acts by binding to special receptor proteins on the membranes of muscle and adipose (fat) cells. Through a series of biochemical reactions, cells collect glucose transporting enzymes (GLUT4) on their outer membranes. By concentrating the GLUT4 on the outer membranes, muscle and fat cells greatly increase the rate of glucose uptake from the bloodstream. Alpha lipoic acid has been found to directly aid in the glucose transporting activity of GLUT4 enzymes and so hasten the uptake of glucose into muscle and fat cells. New clinical reports bolster this view.



Continued

Alpha Lipoic acid

continued

CASE 1:

Thirteen type 2 diabetic patients received either 1000 mg of alpha lipoic acid or only saline during a typical glucose-clamp study₂. After acute administration of alpha lipoic acid, the glucose infusion rate increased by 47%, the metabolic clearance rate of glucose significantly increased, insulin sensitivity increased by 57%, while the control group (saline only) did not show any significant changes of blood chemistry. These are terrific numbers!

CASE 2:

Similar results were observed when alpha lipoic acid was administered in smaller amounts over a period of 10 days to patients with type 2 diabetes₃. Twenty patients with type 2 diabetes received 500 mg of alpha lipoic acid as daily infusions over a period of ten days. The glucose-clamp assay was performed on days 0 and 11. Administration of alpha lipoic acid resulted in a significant increase of insulin-stimulated glucose-uptake by about 30% with this treatment. There was little change in fasting plasma levels of glucose or insulin, but this is probably due to the short study period. These results are consistent with the idea that alpha lipoic acid aids in collection of the GLUT4 enzymes on the cell membranes and stimulates glucose transport into muscle and fat cells.

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.

Alpha lipoic acid nutrition may be an important treatment for diabetic polyneuropathy, that serious complication of long-term hyperglycemia. A recent multi-center study of 100 diabetics with polyneuropathy reported very interesting results. Patients, both diabetes types 1 and 2, men and women all on medications (69 on insulin therapy and 31 on oral hypoglycemics, the average polyneuropathy duration of 3 year); were first placed on 600 mg intravenous alpha lipoic acid for 3 weeks followed up with 3 months of daily, nutritional 300-600 mg of alpha lipoic acid.

Significant improvements were observed after treatment for many important symptoms of polyneuropathy; sensory symptoms of polyneuropathy, polyneuropathy pain sensations, total polyneuropathy symptoms score, subjective assessment by patients and subjective findings of physicians. *Only one case out of the 100 patients reported no improvement – about that expected for human non-compliance.* One should conclude that the application of alpha lipoic acid helps decrease the symptoms of diabetic neuropathy₄.

SUMMARY. Given the serious nature of diabetes, the compounding and very serious nature of polyneuropathy and the excellent clinical results reported by many, there are several reasons to bolster the diets of diabetics with this essential nutrient.

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