

# Alpha-Lipoic Acid

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## What is it?

Alpha lipoic acid or thiotic acid is a nutrient that is produced in tiny amounts by the human body. It plays a role in the conversion of sugar to energy. Alpha lipoic acid is also a powerful antioxidant.

Many of the body's functions rely on a series of reactions called oxidation. Molecules called free radicals are a natural by-product of oxidation. Free radicals can damage the body in much the same way that rust damages a car. To prevent damage, antioxidants like vitamins C and E can counter the effects of free radicals. In order to protect itself, the body also manufactures a substance called glutathione, which is found in cell membranes. Study results suggest that people living with HIV (PHA) have lower levels of glutathione and higher levels of free radicals than HIV-negative people.

Alpha-lipoic acid is a small molecule with chemical properties that allow it to pass easily in and out of cells. It can capture free radicals directly or by removing them from other antioxidants like vitamins C and E. By doing so, alpha-lipoic is in effect able to "recharge" or "recycle" these vitamins. Studies, including one very small German study involving ten HIV-positive men, have shown that alpha-lipoic acid can also recycle glutathione, which may help improve the body's own antioxidant defences.

## What do people with HIV use this supplement for?

### — To protect the liver

The liver stores nutrients and converts them to hormones, proteins and ready sources of energy. It modifies and breaks down most

drugs and processes wastes from other parts of the body. Many free radicals are produced in the liver, an organ that normally has large stores of glutathione. If the number of free radicals overwhelms the body's natural protection system, the liver may become damaged.

Alpha-lipoic acid has been used to treat liver poisoning due to alcohol, mushrooms and heavy metals, but trial results have been mixed. However, test-tube studies demonstrating alpha-lipoic acid's antioxidant abilities and its role in glutathione recycling have encouraged its use in order to protect the liver. According to nutritionist Lark Lands, several people with HIV have experienced an improvement in liver function thanks to alpha-lipoic acid.

### — To treat peripheral neuropathy

Some people with HIV experience peripheral neuropathy, a condition of the nervous system that appears as tingling or burning in the hands and feet. This is usually associated with the anti-HIV drugs ddI, ddC and d4T. Since alpha-lipoic acid has been approved in Germany to treat diabetic neuropathy, some people with HIV are also using it. Clinical trials in both humans and animals suggest that alpha-lipoic acid is an effective treatment for diabetic neuropathy but it is unclear whether it is more effective than other, cheaper antioxidants. One study of 80 people with diabetic neuropathy tested three different antioxidants: vitamin C, selenium and alpha-lipoic acid. All three treatments improved neuropathy symptoms but none was clearly superior. No study using alpha-lipoic acid to treat HIV-related neuropathy has been done.

### — To treat lipodystrophy

Lipodystrophy is a collection of symptoms including muscle wasting, high fat (triglyceride) levels in the blood and abnormal fat distribution. Lipodystrophy seems to be related to the use of antiretroviral drugs. Many HIV-positive people also experience decreased insulin sensitivity, a condition in which the body's cells are less capable of using insulin to convert sugar into energy. One study of HIV-positive men showed that decreased insulin sensitivity was associated with higher amounts of fat in the abdomen and a greater degree of muscle wasting in the arms and legs. Another small study conducted in 74 diabetics showed that four weeks of daily alpha-lipoic acid treatment improved insulin sensitivity. Each of the doses used (600 to 1800 mg a day) produced the same results. The use of alpha-lipoic acid to treat decreased insulin sensitivity in HIV-positive people has not been tested.

### — To prevent and treat HIV-related dementia

Brain cells may be especially sensitive to the accumulation of free radicals. Alpha lipoic acid has been shown to pass easily from the blood into the central nervous system. Some nutritionists, including Lark Lands, have suggested that alpha-lipoic acid be used to treat HIV-related dementia and cognitive impairment (problems with memory, thinking, concentration etc.). However, alpha-lipoic acid produced no improvements during a study involving 36 PHAs with mild cognitive impairment.

### — To slow down HIV replication

Increased levels of free radicals inside immune cells may trigger HIV replication. Test-tube studies suggest that alpha-lipoic acid can slow a cell's production of HIV by decreasing levels of free radicals and, perhaps, by interfering directly with the replication process itself. Unfortunately, no trials in humans or animals have been done.

## Available forms and usage

Alpha-lipoic acid is sold in capsules and tablets primarily in health-food stores. The dose usually recommended for HIV-positive people is 300 mg a day, but some PHAs take up to 600 mg daily. Alpha-lipoic acid may reduce the amount of minerals, including iron, in the body through a process called chelation. Many nutritionists recommend therefore that alpha-lipoic acid be taken with a multi-vitamin containing minerals. A multivitamin and alpha-lipoic acid can be taken at the same time if desired.

## Cautions and concerns

Alpha-lipoic acid has virtually no side effects. According to one report, alpha-lipoic acid could reduce platelet levels (cells that contribute to blood clotting), but this finding has not been confirmed in other studies. Skin rash has been reported in a few people taking more than 600 mg daily. Because alpha-lipoic acid affects the way insulin behaves in the body, insulin-dependent diabetics may need to adjust their insulin dose in order to take this supplement safely.

## References

Bustamante J, Lodge JK et al. "-lipoic acid in liver metabolism and disease. *Free Radical Biology and Medicine* 1998 Apr;24(6):1023-39.

DAAIR. Alpha-lipoic Acid (Thiotic acid) 1999. Available at: <http://www.aids.org/daair/>

Dana Consortium on the Therapy of HIV Dementia and Related Cognitive Disorders. A randomized, double-blind placebo-controlled trial of deprenyl and thioctic acid in human immunodeficiency virus-associated cognitive impairment. *Neurology* 1998 Mar; 50(3):645-51.

Dobmeyer TS, Findhammer S, et al. Ex vivo induction of apoptosis in lymphocytes is mediated by oxidative stress: role for lymphocyte loss in HIV infection. *Free Radical Biology and Medicine* 1997;22(5):775-785.

Fuchs J, et al. Studies on lipoate effects of blood redox state in human immunodeficiency virus infected patients. *Arzneimittelforschung*. 1993;43(12):1359--1362 as quoted in DAAIR. Alpha-lipoic Acid (Thiotic acid) 1999. Available at: <http://www.aids.org/daair/>

Han D, Tritschler HJ, Packer L, a[alpha] Lipoic Acid Increases Intracellular Glutathione in a Human T-lymphocyte Jurkat Cell Line. *Biochemical and*

*Biophysical Research Communications*  
1995;207(1):258-264.

Hadigan C, Corcoran C et al. Fasting hyperinsulinemia in human immunodeficiency virus infected men: Relationship to body composition, gonadal function and protease inhibitor use. *Journal of Clinical Endocrinology and Metabolism* 2000 Jan;85(1):35-41.

Jacobs S, Ruus P et al. Oral administration of RAC- $\alpha$ -lipoic acid modulates insulin sensitivity in patients with type-2 diabetes mellitus: A placebo controlled pilot trial. *Free Radical Biology and Medicine* 1999 Aug;27(3-4):309-14.

Kahler W et al. Diabetes mellitus - a free radical associated disease. *Gesante Inn Med* 1993;223-232 as quoted in Murray MT. *Encyclopedia of Nutritional Supplements*. Rocklin: Prima Publishing, 1996.

Lands Lark. Lipoic Acid (Thiotic Acid.) Boston Buyers Club 1998. Available at <http://www.vitatime.com/>

Merin JP, Matsuyama M et al. Alpha lipoic acid blocks HIV-1 LTR-dependent expression of hygromycin resistance in THP-1 stable transformants. *FEBS Letters* 1996 Sept;394(1):9-13.

Murray MT. *Encyclopedia of Nutritional Supplements*. Rocklin: Prima Publishing, 1996.

Suzuki YJ, et al. Alpha-lipoic acid is a potent inhibitor of NF-kappa B activation in human T cells. *Biochem Biophysical Research and Communications*. 1992;189(3):1709-1715.

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