

# Alpha-Lipoic Acid

## The Universal Antioxidant with Metabolic Functions

### DESCRIPTION

Alpha-Lipoic Acid tablets, provided by Douglas Laboratories®, contain 100 mg of pure alpha-lipoic acid. Alpha-lipoic acid is a non-vitamin coenzyme that carries out important metabolic and antioxidant functions in the body.

### FUNCTIONS

Alpha-lipoic acid is a nutritional coenzyme that is involved in energy metabolism of proteins, carbohydrates and fats, has physiological functions in blood glucose disposal, and is able to scavenge a number of free radicals.

Alpha-lipoic acid is a fat- and water-soluble, sulfur-containing coenzyme. It functions in the body much like a B-vitamin, since it is involved in energy production. As part of several multi-enzyme complexes located in the mitochondria, alpha-lipoic acid is essential for metabolizing carbohydrates, proteins, and fats, and for the conversion of their energy into ATP. Two of these enzyme complexes, PDH (pyruvate dehydrogenase) and alpha-KGDH (alpha-ketoglutarate dehydrogenase) are part of the citric acid cycle (Krebs cycle), and as such assume a central role for general energy production. Another lipoic acid containing enzyme complex, BCKADH (branched-chain keto-acid dehydrogenase), is involved in deriving energy from the branched chain amino acids, leucine, isoleucine, and valine.

A related metabolic function of alpha-lipoic acid is its role in blood glucose disposal. This important coenzyme appears to be necessary for the normal transport of blood glucose into the cell. This may be explained by its functions in the glucose-metabolizing enzymes, PDH and alpha-KGDH, but some researchers suspect a more direct role in cellular glucose uptake at the cell membrane.

As early as 1959, alpha-lipoic acid was suggested to be an antioxidant, since it could extend the actions of vitamin C in guinea pigs, and those of vitamin E in rats. It is only recently, however, that the specific actions of alpha-lipoic acid in free radical quenching,

metal chelation, and antioxidant regeneration have been investigated.

Body cells and tissues are threatened continuously by damage caused by toxic free radicals and reactive oxygen species (e.g., peroxides) which are produced during normal oxygen metabolism, and by toxic agents in the environment. Free radicals, once formed, are capable of disrupting metabolic activity and cell structure. When this occurs, additional free radicals are produced which, in turn, can result in more extensive damage to cells and tissues. The uncontrolled production of free radicals is thought to be a major contributing factor to many degenerative diseases.

Alpha-lipoic acid is unique among biological antioxidants, because it is soluble in both water and lipids. This allows it to neutralize free radicals just about everywhere in the body, inside and outside the cells. Due to its unique sulfur-containing structure, alpha-lipoic acid can scavenge several types of free radicals, such as the highly reactive hydroxyl, and singlet oxygen free radicals. It is also capable of suppressing the generation of free radicals in the first place, since alpha-lipoic acid chelates transition metals, such as iron and copper. Because alpha-lipoic acid is involved in so many different antioxidant functions in virtually all body tissues, it has been called the universal antioxidant.

Besides being a universal free radical scavenger, alpha-lipoic acid can also recharge other antioxidant systems throughout the body. As mentioned earlier, it can extend the activity of vitamins C and E. In addition, alpha-lipoic acid can also regenerate glutathione.

### INDICATIONS

Alpha-lipoic acid may be a beneficial dietary supplement for those concerned about a more complete antioxidant defense system and maintaining proper glucose metabolism. Dietary and supplementary alpha-lipoic acid is efficiently absorbed, transported to the tissues, and readily taken up by the cells. LPA

*(continued on reverse)*

## **FORMULA (LPA)**

### **Each scored tablet contains:**

Alpha-Lipoic Acid..... 100 mg

## **SUGGESTED USE**

One tablet twice daily with meals, or as directed by physician.

## **SIDE EFFECTS**

No adverse effects have been reported.

## **STORAGE**

Store in a cool, dry place, away from direct light.  
Keep out of reach of children.

## **REFERENCES**

Baur A, Harter T, Peukert M, Jahn G, Kalden JR, Fleckenstein B. Alpha-lipoic acid is an effective inhibitor of human immuno-deficiency virus

(HIV-1) replication. *Klin Wochenschr* 1991;69:722-724.

Jacob S, Henriksen EJ, Schiemann AL, et al. Enhancement of glucose disposal in patients with Type 2 diabetes by alpha-lipoic acid. *Arzneimittelforschung* 1995;45:872-874.

Nagamatsu M, Nickander KK, Schmelzer JD, et al. Lipoic acid improves nerve blood flow, reduces oxidative stress, and improves distal nerve conduction in experimental diabetic neuropathy. *Diabetes Care* 1995;18:1160-1167.

Ou P, Tritschler HJ, Wolff SP. Thiocctic (lipoic) acid: A therapeutic metal-chelating antioxidant. *Biochem Pharmacol* 1995;50:123-126.

Packer L, Witt EH, Tritschler HJ. Alpha-lipoic acid as a biological antioxidant. *Free Radic Biol Med* 1995;19:227-250.

Packer L. Antioxidant properties of lipoic acid and its therapeutic effects in prevention of diabetes complications and cataracts. *Ann N Y Acad Sci* 1994;738:257-264.

Scott BC, Aruoma OI, Evans PJ, et al. Lipoic and dihydrolipoic acids as antioxidants. A critical evaluation. *Free Radic Res* 1994;20:119-133.

Suzuki YJ, Tsuchiya M, Packer L. Lipoate prevents glucose-induced protein modifications. *Free Radic Res Commun* 1995;17:211-217.

**These statements have not been evaluated by the Food and Drug Administration.**

**This product is not intended to diagnose, treat, cure, or prevent any disease.**

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