

Alpha-Lipoic Acid: Antioxidant Activity against Non-Enzymatic Peroxidation of Rat Kidney and Liver Mitochondria

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ABSTRACT

Reactive Oxygen Species (ROS) participate in the induction and progression of damage in many human pathologies, such as heart attack, cerebral ischemia, diabetic neuropathy, and Alzheimer's disease, among others. Alpha Lipoic Acid (ALA, also called thioctic acid) is a sulfur compound that acts as a growth factor in some microorganisms and as a coenzyme or prosthetic group in mammalian tissues. The beneficial action of ALA is due to the high antioxidant power that allows it to capture numerous free radicals such as Hydroxyl Radical (OH^{\bullet}), Hypochlorous (HClO^{\bullet}), and oxygen (O^{\bullet}). ALA easily crosses cell membranes acting in both lipophilic and hydrophilic media, so it can act against oxidative stress and prevent cell damage at many levels. In the study reported here the effect of ALA on chemiluminescence of mitochondria isolated from liver and kidney rats was analyzed. After incubation of both mitochondria in ascorbate (0.4mM)- Fe^{2+} ($2.15\mu\text{M}$) system (120min at 37°C), non-enzymatic peroxidation, it was observed that the total cpm/mg protein originated from light emission: chemiluminescence was lower in liver and kidney mitochondria obtained from ALA group than in the control group (without ALA). Moreover, it was observed that the ALA was reduced, concentration dependent (0.05 mg , 0.15 mg and 0.25 mg of solution), of chemiluminescence, measured as total cpm. The analysis of chemiluminescence indicate that ALA may act as antioxidant protecting rat liver and kidney mitochondria from peroxidative damage.

Keywords:

Headaches, Tension headache, Post-Traumatic Headaches, Microangiopathy, Leukoencephalopathy, Vascular dementia, Cardiovascular diseases, High blood pressure, Neurologic diseases