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Lipoic acid attenuates hypertension and improves insulin sensitivity, kallikrein activity and nitrite levels in high fructose-fed rats.

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Chronic feeding of fructose to normal rats causes impaired glucose tolerance, loss of tissue sensitivity to insulin, hyperinsulinemia and hypertension. alpha-Lipoic acid (LA), a co-enzyme known for its potent antioxidant effects, stimulates insulin-mediated glucose uptake in clinical and experimental diabetes. The purpose of this study was to examine whether LA can mitigate fructose-induced insulin resistance and associated abnormalities. Male Wistar rats of body weights 150-170 g were divided into 4 groups containing 12 rats each. Control rats received a control diet containing starch and water ad libitum. Fructose rats received a fructose-enriched diet (>60% of total calories). Fructose + LA rats received a fructose diet and LA (35 mg/kg b.w.) intraperitoneally. Control + LA rats received a normal diet and LA (35 mg/kg b.w.) intraperitoneally. After the treatment period of 20 days, blood pressure (BP) was measured. Oral glucose-tolerance test, insulin-sensitivity index, urea and creatinine clearance tests, and plasma and urinary sodium and potassium levels were analysed. Kallikrein activity and nitrite content were assayed. Additionally, the activities of RBC-membrane Na(+)/K(+) ATPase and Ca(2+) ATPase enzymes were assayed. Fructose rats showed increased BP, decreased glucose tolerance, decreased insulin sensitivity and altered sodium and potassium levels and renal clearance. LA supplementation mitigated these alterations. The increase in BP was attenuated and the levels of biochemical parameters were brought close to normal. The BP-lowering effect of LA in fructose rats may be related to improvement in insulin sensitivity.

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