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## L-carnitine is a calcium chelator: a reason for its useful and toxic effects in biological systems.

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**Abstract:** BACKGROUND: Investigation of the direct link between L-carnitine (LC), a quaternary ammonium compound that facilitates the passage of unsaturated fatty acids into the mitochondrial matrix, and free calcium ( $\text{Ca}^{2+}$ ) is needed to explain a number of varying results obtained from different in vitro and in vivo studies of LC as a supplement. METHODS: The chemical structure of LC, which contains oxygen ligand atoms, prompted to measure its activity as a  $\text{Ca}^{2+}$  chelator. The measurement was carried out spectrophotometrically by measuring the reduction in the formation of  $\text{Ca}^{2+}$ -o-cresolphthalein complexone (Ca-CPC) in the presence of different doses of LC (0.075, 0.75, and 7.5 mM) compared to the control (0.0 mM LC). RESULTS: The effect of LC was measured as a free entity in solution and when added to human serum. Our results showed a significant decrease ( $p < 0.05$ ) in the average absorbance of Ca-CPC in the presence of LC compared to the control. CONCLUSIONS: In conclusion, LC exhibits a significant  $\text{Ca}^{2+}$  chelating activity. As  $\text{Ca}^{2+}$  is vital in the biochemical and physiological processes of living cells, LC could be affecting the calcium-dependent biological systems by limiting the levels of free  $\text{Ca}^{2+}$ . Examples include decelerating the blood clotting process, amplifying the effect of anticoagulants, reducing nitric oxide synthase activity, inhibiting