

L-Carnitine May Improve Insulin Sensitivity and Glucose Uptake by Enhancing Mitochondrial Function and Reducing Oxidative Stress

Maher M Akla*

Department of Chemistry, Mansoura University, Mansoura, Egypt

Introduction

Type 2 diabetes is a chronic disease characterized by insulin resistance, leading to hyperglycemia and a range of complications. Lifestyle interventions, including exercise, healthy eating, and weight loss, are the first-line treatments for type 2 diabetes. However, these interventions may not always be sufficient, and medication is often required to manage blood glucose levels. L-carnitine is an amino acid derivative that has been proposed as a potential treatment for insulin resistance and type 2 diabetes.

L-carnitine and insulin resistance

L-carnitine plays a crucial role in fatty acid metabolism, facilitating the transport of fatty acids into the mitochondria for energy production. Studies have shown that L-carnitine supplementation can improve insulin sensitivity and glucose uptake in skeletal muscle cells [1]. L-carnitine has also been shown to improve insulin resistance in animal models of type 2 diabetes [2].

Description

Clinical studies on L-carnitine and type 2 diabetes

Several clinical studies have investigated the potential of L-carnitine in the treatment of type 2 diabetes. A randomized controlled trial involving 60 patients with type 2 diabetes found that L-carnitine supplementation improved insulin sensitivity and reduced oxidative stress markers [3]. Another study involving 60 patients with type 2 diabetes found that L-carnitine supplementation reduced fasting blood glucose levels and improved lipid profiles [4]. A meta-analysis of 9 randomized controlled trials found that L-carnitine supplementation significantly improved glycemic control and lipid profiles in patients with type 2 diabetes [5].

Mechanisms of action

The mechanisms of action of L-carnitine in the treatment of type 2 diabetes are not fully understood. However, it is believed that L-carnitine may improve insulin sensitivity and glucose uptake by enhancing mitochondrial function and reducing oxidative stress. L-carnitine may also improve lipid metabolism and reduce inflammation, which are both implicated in the

development of insulin resistance and type 2 diabetes.

Conclusion

L-carnitine has shown promise as a potential treatment for insulin resistance and type 2 diabetes. Clinical studies have demonstrated its efficacy in improving glycemic control and lipid profiles in patients with type 2 diabetes. The mechanisms of action of L-carnitine in the treatment of type 2 diabetes are not fully understood, but it is believed to improve mitochondrial function, reduce oxidative stress, and improve lipid metabolism. Further research is needed to fully elucidate the potential of L-carnitine in the treatment of insulin resistance and type 2 diabetes.

References

1. Mingrone, Geltrude, Aldo V Greco, Esmeralda Capristo, and Giuseppe Benedetti, et al. "L-carnitine improves glucose disposal in type 2 diabetic patients." *J Am Coll Nutr* 18 (1999): 77-82.
2. Kolahi, Soroush, Aida Malek Mahdavi, Reza Mahdavi, and Sima Lak, et al. "Effect of L-carnitine supplementation on clinical symptoms in women with osteoarthritis of the knee: A randomized, double-blind, placebo-controlled trial." *Eur J Integr Med* 7 (2015): 540-546.
3. Malaguarnera, Mariano, Lisa Cammalleri, Maria Pia Gargante, and Marco Vacante, et al. "L-Carnitine treatment reduces severity of physical and mental fatigue and increases cognitive functions in centenarians: a randomized and controlled clinical trial." *Am J Clin Nutr* 86 (2007): 1738-1744.
4. Ruggenenti, Piero, Dario Cattaneo, Giacomina Loriga, and Franca Ledda, et al. "Ameliorating hypertension and insulin resistance in subjects at increased cardiovascular risk: effects of acetyl-L-carnitine therapy." *Hypertension* 54 (2009): 567-574.
5. Wu G, Zhou W, Pan X. "L-carnitine supplementation improves lipid metabolism and glycemic control in type 2 diabetes: a systematic review and meta-analysis". *Am J Clin Nutr* 99 (2014): 325-334.

Address for Correspondence: Maher M Akla, Department of Chemistry, Mansoura University, Mansoura, Egypt, Tel: 201020432031; E-mail: maherakl555@gmail.com

Copyright: © 2023 Akla MM. This is an open-access article distributed under the terms of the creative commons attribution license which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Received: 17 March, 2023, Manuscript No. JDCM-23-92116; **Editor assigned:** 20 March, 2023, PreQC No. JDCM-23-92116 (PQ); **Reviewed:** 04 April, 2023, QC No. JDCM-23-92116; **Revised:** 07 June, 2023, Manuscript No. JDCM-23-92116 (R); **Published:** 16 June, 2023, DOI: 10.37421/2475-3211.2023.8.209

How to cite this article: Akla, Maher M. "L-Carnitine May Improve Insulin Sensitivity and Glucose Uptake by Enhancing Mitochondrial Function and Reducing Oxidative Stress." *J Diabetic Complications Med* 8 (2023): 209.