

Effect of Magnesium Deficiency on Insulin Resistance and Type 2 Diabetes

Maher M Akla*

Department of Chemistry, Mansoura University, Mansoura, Egypt

Introduction

Magnesium is an essential mineral that plays a critical role in many physiological processes, including glucose metabolism. Magnesium deficiency is prevalent worldwide, and several studies have linked it to insulin resistance and type 2 diabetes. This review aims to explore the effect of magnesium deficiency on the incidence of insulin resistance and type 2 diabetes, as well as the potential mechanisms behind this association [1].

Magnesium and insulin resistance and type 2 diabetes

Insulin resistance is a condition in which cells become resistant to the effects of insulin, leading to elevated blood glucose levels. Several studies have shown that magnesium deficiency is associated with insulin resistance. Magnesium plays a crucial role in glucose metabolism, as it is required for the activation of insulin receptors and the transport of glucose into cells. Magnesium deficiency reduces insulin sensitivity, leading to impaired glucose uptake and increased insulin secretion. A meta-analysis of observational studies found that magnesium intake was inversely associated with the risk of type 2 diabetes, indicating that low magnesium intake may be a risk factor for insulin resistance and type 2 diabetes [2,3].

Description

Mechanisms behind the association

The mechanisms behind the association between magnesium deficiency and insulin resistance/type 2 diabetes are not entirely understood. One proposed mechanism is that magnesium deficiency leads to oxidative stress and inflammation, which have been shown to play a role in the development of insulin resistance and type 2 diabetes. Magnesium deficiency also alters the expression of several genes involved in glucose metabolism, leading to impaired insulin sensitivity. Additionally, magnesium deficiency may alter the gut microbiota, which has been shown to play a role in glucose metabolism and insulin resistance [4,5].

Conclusion

Magnesium deficiency is prevalent worldwide, and several studies have linked it to insulin resistance and type 2 diabetes. Magnesium plays

a crucial role in glucose metabolism, and magnesium deficiency reduces insulin sensitivity, leading to impaired glucose uptake and increased insulin secretion. The mechanisms behind the association between magnesium deficiency and insulin resistance/type 2 diabetes are not entirely understood, but oxidative stress, inflammation, altered gene expression, and gut microbiota have been proposed as potential mechanisms. Further research is needed to elucidate the mechanisms behind this association and to determine the impact of magnesium supplementation on the prevention and treatment of insulin resistance and type 2 diabetes.

References

- Rodriguez-Moran, Martha, and Fernando Guerrero-Romero. "Oral magnesium supplementation improves insulin sensitivity and metabolic control in type 2 diabetic subjects: a randomized double-blind controlled trial." *Diabetes Care* 26 (2003): 1147-1152.
- Veronese N, S Watutantrige-Fernando, C Luchini, and M Solmi, et al. "Effect of magnesium supplementation on glucose metabolism in people with or at risk of diabetes: a systematic review and meta-analysis of double-blind randomized controlled trials." *Eur J Clin Nutr* 70 (2016): 1354-1359.
- Hruby, Adela, James B Meigs, Christopher J O'Donnell, and Paul F Jacques, et al. "Higher magnesium intake reduces risk of impaired glucose and insulin metabolism and progression from prediabetes to diabetes in middle-aged americans." *Diabetes Care* 37 (2014): 419-427.
- Guerrero-Romero F, HE Tamez-Perez, G eal Gonzalez-Gonzalez, and AM Salinas-Martinez, et al. "Oral magnesium supplementation improves insulin sensitivity in non-diabetic subjects with insulin resistance. A double-blind placebo-controlled randomized trial." *Diabetes Metab* 30 (2004): 253-258.
- Barbagallo, Mario, and Ligia J Dominguez. "Magnesium metabolism in type 2 diabetes mellitus, metabolic syndrome and insulin resistance." *Arch Biochem Biophys* 458 (2007): 40-47.

How to cite this article: Akla, Maher M. "Effect of Magnesium Deficiency on Insulin Resistance and Type 2 Diabetes." *J Diabetic Complications Med* 9 (2024): 277.

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

Copyright: © 2024 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-23-92104; **Editor assigned:** 20 March, 2023, PreQC No. JDCM-23-92104 (PQ); **Reviewed:** 04 April, 2023, QC No. JDCM-23-92104; **Revised:** 22 June, 2024, Manuscript No. JDCM-23-92104 (R); **Published:** 29 June, 2024, DOI: 10.37421/2475-3211.2024.9.277