

Insulin Resistance: Causes and Modern Scientific Approaches to Management and Prevention

Sopo Tskitishvili

E-mail: sopo.tskitishvili567@ens.tsu.edu.ge

Department of Chemistry, Faculty of Exact and Natural Sciences Ivane Javakhishvili Tbilisi State
University I. Chavchavadze Ave. 3, Tbilisi, 0179, Georgia

The paper examines the essence of insulin resistance, as one of the most common metabolic disorders, its mechanisms of development, and modern management strategies. It describes the role of insulin in the human body and the pathophysiological basis of insulin resistance. Particular attention is paid to the causes of insulin resistance, including genetic, environmental, and behavioral factors such as overweight, physical inactivity, and unbalanced nutrition[1,2].

Carbohydrate intake plays an important role in the development of insulin resistance. Excessive consumption of rapidly absorbable carbohydrates leads to frequent increases in glucose and insulin levels, which over time reduces cellular sensitivity to insulin. At the same time, appropriate intake of low-glycemic-index and fiber-rich carbohydrates contributes to improved glucose metabolism and increased insulin sensitivity[6].

The relationship between insulin resistance and such pathologies as type 2 diabetes mellitus[3,4], metabolic syndrome, and cardiovascular diseases is also discussed. The paper further analyzes management approaches based on modern scientific research, including lifestyle modification, physical activity, and dietary intervention[6]. The study emphasizes the importance of early detection and comprehensive management of insulin resistance for the prevention of diabetes and other metabolic diseases.

1. Trends in insulin resistance: insights into mechanisms and therapeutic strategy. [Mengwei Li](#), [Xiaowei Chi](#), [Ying Wang](#), [Sarrah Setrerrahmane](#), [Wenwei Xie](#) & [Hanmei Xu](#) 7, Article number: 216 (2022)
2. Insulin Resistance. Andrew M. Freeman; Luis A. Acevedo; Nicholas Pennings. August 17, 2023.
3. Reaven, G. M. (1988). Role of insulin resistance in human disease. *Diabetes*, 37(12), 1595–1607.
4. DeFronzo, R. A., & Tripathy, D. (2009). Skeletal muscle insulin resistance is the primary defect in type 2 diabetes. *Diabetes Care*, 32(Suppl 2), S157–S163.

5. Hu, F. B. (2011). Globalization of diabetes: the role of diet, lifestyle, and genes. *Diabetes Care*, 34(6), 1249–1257.
6. Willett, W., Manson, J., & Liu, S. (2002). Glycemic index, glycemic load, and risk of type 2 diabetes.