

A 4-Month Low-carb Nutrition Intervention Study Aimed to Demonstrate the Significance of Addressing Insulin Resistance in 2 Subjects with Type-2 Diabetes for Better Management

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Abstract : Insulin resistance (IR) is a condition that occurs when cells in the body become less responsive to insulin, leading to higher levels of both insulin and glucose in the blood. This condition is linked to metabolic syndromes, including diabetes. It is crucial to address IR promptly after diagnosis to prevent long-term complications associated with high insulin and high blood glucose. This four-month case study highlights the importance of treating the underlying condition to manage diabetes effectively. Insulin is essential for regulating blood sugar levels by facilitating the uptake of glucose into cells for energy or storage. In IR individuals, cells are less efficient at taking up glucose from the blood resulting in elevated blood glucose levels. As a result of IR, beta cells produce more insulin to make up for the body's inability to use insulin effectively. This leads to high insulin levels, a condition known as hyperinsulinemia, which further impairs glucose metabolism and can contribute to various chronic diseases. In addition to regulating blood glucose, insulin has anti-catabolic effects, preventing the breakdown of molecules in the body, such as inhibiting glycogen breakdown in the liver, inhibiting gluconeogenesis, and inhibiting lipolysis. If a person is insulin-sensitive or metabolically healthy, an optimal level of insulin prevents fat cells from releasing fat and promotes the storage of glucose and fat in the body. Thus optimal insulin levels are crucial for maintaining energy balance and plays a key role in metabolic processes. During the four-month study, researchers looked at the impact of a low-carb dietary (LCD) intervention on two male individuals (A & B) who had Type-2 diabetes. Although neither of these individuals were obese, they were both slightly overweight and had abdominal fat deposits. Before the trial began, important markers such as fasting blood glucose (FBG), triglycerides (TG), high-density lipoprotein (HDL) cholesterol, and HbA1c were measured. These markers are essential in defining metabolic health, their individual values and variability are integral in deciphering metabolic health. The ratio of TG to HDL is used as a surrogate marker for IR. This ratio has a high correlation with the prevalence of metabolic syndrome and with IR itself. It is a convenient measure because it can be calculated from a standard lipid profile and does not require more complex tests. In this four-month trial, an improvement in insulin sensitivity was observed through the ratio of TG/HDL, which, in turn, improves fasting blood glucose levels and HbA1c. For subject A, HbA1c dropped from 13 to 6.28, and for subject B, it dropped from 9.4 to 5.7. During the trial, neither of the subjects were taking any diabetic medications. The significant improvements in their health markers, such as better glucose control, along with an increase in energy levels, demonstrate that incorporating LCD interventions can effectively manage diabetes.

Keywords : metabolic disorder, insulin resistance, type-2 diabetes, low-carb nutrition

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