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ISSN: 2572-5629
Diabetes Case Reports

Commentary

Synthesis of Adiponectin Proteins in Insulin Resistance and Type 2 Diabetes

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DESCRIPTION

Adiponectin is a hormone released by adipose tissue that helps in insulin sensitivity and inflammation. Low levels of adiponectin are associated with several diseases including obesity, high glucose, Type 2 diabetes, atherosclerosis, and cytokines. The increased prevalence of excessive visceral obesity and obesity-related cardiovascular risk factors is closely associated with the increased incidence of cardiovascular disease and Type 2 diabetes. This accumulation of vascular risk factors in (visceral) obesity is often referred to as the metabolic syndrome. It is to elucidate the specific endocrine function of this visceral fat depot.

Adiponectin is produced exclusively by adipocytes and circulates in plasma in three different full-length isoforms (trimers, hexamers, and multimers) as globular forms. Adiponectin synthesis is decreased in obesity, insulin resistance, metabolic syndrome, and Type 2 diabetes. Males have lower plasma adiponectin levels than females. Adiponectin has a variety of antiatherosclerotic effects, inhibiting hepatic glucose production and promoting glucose uptake into muscle, possibly by enhancing the uncoupling of a Adenosine Triphosphate (ATP) production, thereby increasing both liver and muscle activity. It improves the insulin sensitivity by increasing fatty acid oxidation *in vitro* and increasing the energy expenditure *in vitro*. In the mitochondria the head of adiponectin has been shown to ameliorate hyperglycemia and hyperinsulinemia in insulin-resistant models.

Type 2 Diabetes is now generally believed to result from a combination of insulin resistance and a relative reduction in the insulin-secreting capacity of pancreatic cells. Cellular dysfunction is the most important risk factor for type 2 diabetes, as seen in normoglycemic subjects. An enlarged cell mass associated with increased nutrient (glucose and FFA) uptake has been reported from the pancreas of obese individuals. With increased insulin resistance, pancreatic cells also increase insulin production, but when this adaptation fails, diabetes develops. is associated with an increased risk of This is probably related not only to effects on insulin sensitivity, but also to effects on the pancreas leading to cell damage.

Evaluation of Adipose Tissue Insulin Resistance Index (Adipo-IR) is still controversial, as many different approaches have been used to characterize Adipo-IR. Using a tracer, palmitate turnover and glycerol release rates can be quantified to obtain a lipolytic index. Our group was one of the first to show that, in humans, inhibition of lipolysis and Free Fatty Acid (FFA) release is related to plasma insulin concentration in the form of a curve that is linear upon logarithmic transformation. All studies agree that the relationship between circulating plasma insulin concentration and lipolysis rate and plasma FFA concentrations is linear when plotted on a logarithmic scale. Therefore, the product of plasma FFA and insulin concentration provided an index of Adipo-IR, which was used to assess adipose tissue sensitivity to insulin in different metabolic states.

CONCLUSION

Obesity is one of the highest health burdens of the 21st century as it contributes to the increased prevalence of related comorbidities, such as insulin resistance and Type 2 diabetes. In particular, chronic inflammation of adipose tissue is considered a major risk factor for developing insulin resistance and Type 2 diabetes in overweight individuals. It triggers the adipose tissue inflammation are poorly defined. However, obesity-induced adipose tissue expansion provides a wealth of unique signals that can initiate an inflammatory response. Dysregulation of the immune system in adipose tissue in obese people leads to chronic disease.

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Received: 05-Dec-2022, Manuscript No. DCRS-22-19783; Editor assigned: 08-Dec-2022, PreQC No. DCRS-22-19783 (PQ); **Reviewed:** 29-Dec-2022, QC No DCRS-22-19783; **Revised:** 06-Jan-2023, Manuscript No. DCRS-22-19783 (R); **Published:** 16-Jan-2023, DOI: 10.35841/2572-5629.23.8.139

Citation: Trout L (2023) Synthesis of Adiponectin Proteins in Insulin Resistance and Type 2 Diabetes. Diabetes Case Rep. 8:139.