

THE RELATIONSHIP BETWEEN SERUM CONCENTRATION OF TNF- α AND INSULIN SENSITIVITY IN RATS WITH DIABETES MELLITUS TYPE 2

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Diabetes and obesity are very common associated metabolic disorders that are linked to chronic inflammation. The development of insulin resistance is driven by multiple factors including an increase in levels of pro-inflammatory cytokines such as tumor necrosis factor- α (TNF- α). This study aimed to explore the links between TNF- α -mediated inflammation, insulin sensitivity, and body weight gain in the rat model of type 2 diabetes mellitus (T2DM). The experiment was performed on 10 weeks old Wistar rats randomized into 2 groups. T2DM was induced by intraperitoneal injection of streptozotocin, administered 15 minutes after an intraperitoneal injection of nicotinamide. After 6 weeks, the animals were euthanized. Insulin and TNF- α were determined by using an enzyme-linked immunosorbent assay kit. Insulin sensitivity indices were calculated. The concentration of TNF- α was significantly higher in animals with T2DM when compared to controls ($p < 0.001$). Quantitative Insulin Sensitivity Check Index (QIUCKI) had significantly lower values in animals with T2DM when compared to controls ($p < 0.001$), whereas values calculated for homeostatic model assessment of insulin resistance (HOMA-IR) were significantly higher ($p < 0.001$). TNF- α correlated positively with HOMA-IR ($r = 0.562$, $p < 0.01$) and negatively with QIUCKI ($r = -0.332$, $p < 0.05$). Additionally, TNF- α correlated positively with specific rate of the body weight gain ($r = 0.667$, $p < 0.01$) in the observed period. The results suggest that an increase in circulating TNF- α concentration might be associated with an increase in body weight gain and reduced insulin sensitivity in rats with T2DM.

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Key words: type 2 diabetes mellitus, TNF- α , insulin sensitivity, body weight, obesity