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## HISTOLOGICAL EVALUATION OF ADIPOSE TISSUE IN RATS EXPOSED TO CHRONIC PSYCHOLOGICAL STRESS AND DIABETES

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**Aim.** The aim of this study was to evaluate morphological changes in white adipose tissue (WAT) in rats exposed to psychological stress and type 1 diabetes mellitus (T1DM).

**Methods.** 35 Wistar rats were randomly assigned to the following groups: Control (n=8), Stress (n=10), T1DM (n=7), and T1DM+Stress (n=10). Chronic psychological stress was induced using the restraint stress protocol. Diabetes was induced via a single intraperitoneal dose of streptozotocin (65 mg/kg). Rats were anesthetized, and the aortas, along with the surrounding adipose tissue, were extracted and prepared for histological evaluation. Tissue samples were analyzed using QuPath (0.4.4). The surface area of 550 adipose cells was measured. Statistical analysis was conducted using MS Excel.

**Results.** The mean adipocyte surface area was 453.82  $\mu\text{m}^2$  in the Control group, 506.52  $\mu\text{m}^2$  in the Stress group, and 159.09  $\mu\text{m}^2$  in the T1DM group. Significant differences were observed between Control and Stress ( $p < 0.001$ ), Control and T1DM ( $p < 0.001$ ), and Stress and T1DM ( $p < 0.001$ ). In group T1DM+Stress, no adipose tissue was found.

**Conclusions.** Psychological stress and T1DM significantly change WAT morphology in rats. Stress exposure resulted in a significant increase in adipocyte surface area compared to Control, indicating adipocyte hypertrophy, whereas T1DM caused a marked reduction in adipocyte size, reflecting adipose tissue atrophy likely due to insulin deficiency and enhanced lipolysis. The differences between all groups were highly significant, confirming the strong impact of both conditions on adipose tissue structure. The absence of detectable adipose tissue in the T1DM+Stress group suggests a severe, possibly synergistic effect of combined metabolic and psychological stressors, leading to extreme depletion of fat reserves. These findings demonstrate that psychological stress and T1DM profoundly and differentially affect adipose tissue, with their combination producing the most severe morphological changes.

**Keywords.** Psychological stress, Type 1 diabetes mellitus, Adipose tissue, morphology.