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DYNAMICS OF SERUM GLUCOSE, INSULIN, CORTISOL AND HBA1C AND JOINT MORPHOLOGY IN RATS WITH ALLOXAN-INDUCED DIABETES

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Diabetes mellitus is a complex metabolic disorder characterized by disturbances in carbohydrate metabolism and hormonal imbalance, which can lead to structural and functional changes in various organs and tissues. Experimental models using alloxan-induced diabetes in laboratory animals are widely applied to investigate the mechanisms of metabolic disorders and their systemic effects.

The aim of this study was to investigate the dynamics of serum glucose, insulin, cortisol, and glycated hemoglobin (HbA1c) levels, as well as morphological changes in the joints of rats with alloxan-induced diabetes.

Experimental diabetes was induced in laboratory rats by intraperitoneal administration of alloxan. Blood serum parameters including glucose, insulin, cortisol, and HbA1c were analyzed to evaluate metabolic disturbances. In addition, histological examinations of knee, ankle, and wrist joints were conducted to assess structural alterations in joint tissues.

The results demonstrated a significant increase in serum glucose and HbA1c levels in diabetic rats, indicating persistent hyperglycemia. At the same time, insulin levels were markedly reduced due to pancreatic β-cell damage caused by alloxan. Elevated cortisol levels suggested activation of stress-related metabolic pathways. Morphological analysis of joint tissues revealed degenerative changes in articular cartilage, disruption of collagen fiber organization, and signs of synovial membrane alterations.

These findings indicate that alloxan-induced diabetes causes profound metabolic disturbances accompanied by morphological changes in joint tissues. The study highlights the systemic impact of diabetes and emphasizes the importance of early detection and prevention of musculoskeletal complications associated with metabolic disorders.