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HEPATIC CHANGES IN DIABETES MELLITUS: HOW THE LIVER RESPONDS TO CHRONIC HYPERGLYCEMIA

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Background:

Diabetes mellitus (DM) affects almost every organ in the body, but the liver is one of the first and most sensitive targets. As the main regulator of glucose and lipid metabolism, the liver undergoes a wide range of changes when insulin levels are reduced or when the body becomes resistant to insulin. These changes often develop quietly, yet they play a major role in the long-term complications seen in diabetic patients.

Keywords: diabetes mellitus, liver changes, steatosis, insulin resistance, inflammation, fibrosis, NAFLD.

Aim:

This work aims to summarize the major metabolic, structural, and molecular alterations that occur in the liver during diabetes mellitus and highlight their clinical significance.

Methods:

A review of scientific articles published between 2018 and 2025 was carried out using PubMed, Scopus, and Web of Science. Studies describing changes in liver metabolism, inflammation, oxidative stress, fibrosis, and vascular function in both Type 1 and Type 2 diabetes were included.

Results:

The literature shows that diabetes leads to several characteristic hepatic changes.

Fat accumulation (steatosis) becomes common due to increased fat production and reduced breakdown.

Insulin resistance disrupts the liver's ability to regulate glucose, resulting in excessive glucose release into the blood.

Oxidative stress and inflammation rise as high blood sugar triggers reactive oxygen species and inflammatory mediators.

Fibrotic changes appear when inflammation persists, potentially progressing to NASH or cirrhosis.

Vascular and mitochondrial dysfunction further weaken liver function and accelerate metabolic damage.

Conclusion:

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Diabetes mellitus triggers a complex chain of metabolic and structural disturbances in the liver. Recognizing these early changes is essential for preventing the development of NAFLD, NASH, and advanced fibrosis. A deeper understanding of these processes may guide future therapeutic strategies that aim to protect liver function in diabetic patients.

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