



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th June, 2026

Website: <https://econferencia.com>

MORPHOLOGICAL CHANGES IN LIVER TISSUE OF RABBITS WITH EXPERIMENTAL METABOLIC SYNDROME UNDER THE INFLUENCE OF A MODIFIED KETOGENIC DIET

Sobir M. Alimov

Scientific Supervisor: Djahangir Kh. Tursunov
Tashkent State Medical University (TSMU)

Relevance:

Metabolic syndrome is one of the leading medical and social problems worldwide and is associated with profound metabolic disturbances, including insulin resistance, dyslipidemia, chronic inflammation, and hepatic dysfunction. The liver is one of the primary target organs affected by metabolic syndrome, where excessive lipid accumulation leads to structural alterations, hepatocyte injury, and progressive impairment of hepatic function. Histological evaluation of liver tissue provides valuable information regarding the severity of hepatic damage and the effectiveness of therapeutic interventions. Modified ketogenic diets have recently emerged as promising non-pharmacological approaches for correcting metabolic disorders; however, their effects on liver morphology remain insufficiently investigated.

Objective:

To evaluate morphological changes in liver tissue of rabbits with experimental metabolic syndrome and to assess the corrective effects of a modified ketogenic diet.



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th June, 2026

Website: <https://econferencia.com>

Materials and Methods:

The study was performed on 60 Chinchilla rabbits. Experimental metabolic syndrome was induced according to the Saidov method for 60 days. Animals were divided into seven groups: intact, control, traditional ketogenic diet, modified ketogenic diet, ezetimibe, metformin, and metformin plus ezetimibe groups. Liver samples were collected after treatment and examined using standard histological techniques. Tissue sections were stained with hematoxylin and eosin and evaluated under light microscopy.

Results:

Histological examination of the intact group demonstrated preserved hepatic architecture with normal hepatic lobules, regularly arranged hepatocyte cords, and intact sinusoidal structures. No signs of inflammation, steatosis, or cellular degeneration were observed.

In the control group with metabolic syndrome, pronounced pathological alterations were identified. These included disorganization of hepatic trabeculae, sinusoidal dilation, hepatocellular vacuolar degeneration, lipid accumulation, and inflammatory cell infiltration within portal areas. Such changes indicated significant structural impairment of liver tissue associated with metabolic syndrome.

Administration of the modified ketogenic diet resulted in substantial improvement of liver morphology. Hepatic architecture was largely restored, hepatocyte arrangement became more regular, and inflammatory infiltration markedly decreased. Signs of hepatocellular degeneration and steatosis were significantly reduced compared with the untreated control group. The degree of tissue recovery observed in the modified ketogenic diet group exceeded that of



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th June, 2026

Website: <https://econferencia.com>

the traditional ketogenic diet group and was comparable to the effects observed in animals receiving combined metformin and ezetimibe therapy.

The histological findings were consistent with biochemical results, including reductions in ALT, AST, ALP, and GGT levels, as well as improvements in lipid metabolism markers.

Conclusions:

1. Experimental metabolic syndrome induces significant structural alterations in liver tissue, including hepatocellular degeneration, steatosis, and inflammatory infiltration.
2. A modified ketogenic diet promotes restoration of normal hepatic architecture and reduces pathological changes associated with metabolic syndrome.
3. The hepatoprotective effect of the modified ketogenic diet is more pronounced than that of the traditional ketogenic diet.
4. Histological and biochemical findings collectively confirm the effectiveness of the modified ketogenic diet in correcting liver damage caused by metabolic syndrome.

References

1. Eslam M., Sanyal A.J., George J. MAFLD: A consensus-driven proposed nomenclature for metabolic-associated fatty liver disease. *Gastroenterology*. 2023;165(4):1023–1031.
2. Younossi Z.M., Golabi P., Paik J.M. Global epidemiology of metabolic dysfunction-associated steatotic liver disease. *Hepatology*. 2024;79(2):567–580.
3. Koliaki C., Liatis S., Kokkinos A. The role of ketogenic diets in metabolic disease management. *Nutrients*. 2024;16(3):412.