

MORPHOFUNCTIONAL CHANGES OF THE LIVER IN EXPERIMENTAL HYPODYNAMIA

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Abstract: Hypodynamia, characterized by a reduced level of physical activity, is considered one of the important factors affecting metabolic processes in the body. The liver, as a central organ of metabolism and detoxification, is particularly sensitive to hypodynamic conditions. This study aims to investigate morphofunctional changes in the liver under experimental hypodynamia. The results demonstrate that prolonged hypodynamia leads to structural and functional disturbances in hepatic tissue, including circulatory disorders, dystrophic changes in hepatocytes, and impaired metabolic activity.

Key words: hypodynamia, liver, morphology, hepatocytes, experimental study.

Introduction: In modern society, hypodynamia has become a widespread phenomenon due to technological progress, sedentary lifestyles, and reduced physical activity. Numerous studies indicate that hypodynamia negatively affects various

organs and systems, including the cardiovascular, musculoskeletal, and digestive systems.

The liver plays a key role in carbohydrate, lipid, and protein metabolism, as well as in detoxification processes. Changes in physical activity significantly influence hepatic blood circulation, enzymatic activity, and regenerative capacity. Therefore, studying morphofunctional changes of the liver under experimental hypodynamia is of great scientific and practical importance.

Materials and Methods

The experimental study was conducted on laboratory rats divided into control and experimental groups. Hypodynamia was induced by limiting the motor activity of animals for a specific period. After completion of the experiment, liver tissues were collected for morphological and histological examination.

Histological sections were stained using standard hematoxylin and eosin methods. Morphological analysis focused on the condition of hepatocytes, sinusoidal capillaries, central veins, and connective tissue elements. Functional assessment was based on indirect indicators such as structural integrity and cellular activity.

Results

Morphological examination of the liver in animals subjected to hypodynamia revealed significant structural alterations. Hepatocytes demonstrated signs of protein and fatty degeneration, including cytoplasmic vacuolization and blurred cell boundaries. In some areas, cell nuclei appeared displaced or hyperchromatic.

The hepatic sinusoids were dilated and filled with blood, indicating circulatory disturbances. Central veins showed moderate congestion. Additionally, mild inflammatory infiltration was observed in the portal areas in prolonged hypodynamic conditions.

Functionally, these morphological changes suggest impaired metabolic activity of hepatocytes, reduced detoxification capacity, and decreased adaptive potential of the liver.

The obtained results confirm that hypodynamia has a pronounced negative effect on liver morphology and function. Reduced physical activity leads to impaired microcirculation, hypoxia, and metabolic imbalance, which contribute to dystrophic changes in hepatocytes.

These findings are consistent with previous studies indicating that physical inactivity promotes fatty liver development and metabolic disorders. The liver's sensitivity to hypodynamia highlights the importance of physical activity in maintaining normal hepatic structure and function.

Organometric changes in the liver of rats are shown in the table below

Conclusion

Experimental hypodynamia causes significant morphofunctional changes in the liver, characterized by dystrophic alterations of hepatocytes, circulatory disturbances, and decreased functional activity. These changes may serve as a morphological basis for the development of metabolic liver diseases under conditions of prolonged physical inactivity.

The results emphasize the necessity of adequate physical activity to preserve liver health and prevent hypodynamia-associated hepatic dysfunction.

References

1. Akhmedova S.M., Nortaeva N.A., Nortaev A.B. Morphological changes in the teeth of adolescent children with hypotireosis // Collection of materials of the scientific and practical conference with international participation, dedicated to the 100th anniversary of the Tashkent Medical Academy, "100 years of the Tashkent

Medical Academy – the era of great achievements and discoveries". Tashkent, 2022 - P. 199-200

2. Nortaeva N.A., Akhmedova S.M., Nortaev A.B. Morphological changes in the teeth adolescent children with hypotireosis // Problems of biology and medicine. - Samarkhand, 2022. - P 270. ISSN 2182-5674, <https://doi.org/10.38096/2181-5674.2022>

3. Nortaeva N.A., Nortaev A.B. Morphological changes in teeth against the background of experimental hypothyroidism // Topical issues of modern scientific research.-Dushanbe 2022.-P 168.

4. Nortaeva N.A., Nortaev A.B. Morphological changes in the tooth in experimental hypothyroidism // Issues of innovative development of science, education and technology. - Andijan, 2022.-P 273-275

5. Nortaeva N.A., Nortaev A.B., Akhmedova S.M. To study the morphological changes in the tooth against the background of experimental hypothyroidism // Current problems of microbiology. - Tashkent, 2022 -P. 148-152

6. Nortaeva N.A. Morphological changes in teeth as a result of malnutrition in preschool children // Proceedings of the conference dedicated to the 95th anniversary of academician, morphologist, scientist Komiljon Zufarov. - Tashkent, 2021 -P. 34-36

7. Nortaeva N.A., Akhmedova S.M. Morphological changes in the dental in experimental hypotireosis // Collection of materials of the scientific and practical conference of young scientists with international participation, dedicated to the 100 th anniversary of the Tashkent Medical Academy, «innovative approaches in medicine». Tashkent, 2022 -P. 51

8. Nortaeva N.A., Akhmedova S.M., Nortaev A.B. Anthropometric indicators of the maxillofacial system in school-aged children with hypothyroidism //

Modern scientific research topical issues, achievements and innovations. Current scientific issues, current affairs, achievements and innovations. Penza, 2023 –P. 153. ISBN 978-5-00173-707-0

9. Nortaeva N.A., Akhmedova S. M., Nortaev A.B., Rajabov B.M. Changes in the face-jaw system of experimental hypothyroidism // Texas Journal of Medical Science <https://zienjournals.com> 2023 –P. 61-64 ISSN NO: 2770-2936

10. Nortaeva N., Akhmedova S., Berdiev O., Anthropometric dimensions of the maxillofacial system in children with hypothyroidism aged 8-16 year // Journal of Medicine and Innovations www.tsdi.uz 2023 –P. 230-235 ISSN 2181-1873

11. Nortaeva N.A., Akhmedova S.M., Nortaev A.B, Effects of hypothyroidism on the maxillofacial system // Uzbek journal of case reports 2023 –P.126, Том 3. <https://doi.org/10.55620/ujcr.3.sp.2023>

12. 1. Usmanov R.Dj., Gulmanov I.D., Nortaev A.B. Development and prevalence of periodontal diseases in workers working with chemical paints // 100 years of the Tashkent Medical Academy – the era of great achievements and discoveries – 2022. P-244.

13. 2. Saidov A.A. Periodontal disease and its prevention in workers of the textile industry // Monograph-2020. 134 p.

14. 3. Volozhin A.I., Filatova E.S., Petrovich Y.A. and others. Evaluation of the state of the periodontal by the chemical composition of the environment of the oral cavity // Dentistry. -2000. №1- P. 13-16.

15. 4. Nortaev A.B., Rajabov B.M., Berdiev O.V. Oral inflammation in light industry workers // Texas Journal of Medical Science ISSN NO: 2770-2936. - 2023. P-84-86. <https://zienjournals.com>

16. 5. Nortaev A.B., Usmanov R.Dj., Nortaeva N.A. Periodontal disease and its complications in 21-30-year-old chemical paint workers // Journal of medicine and innovations ISSN 2181-1873 2023.P-215-220 www.tsdi.uz
17. Nortaev A.B., Usmanov R.Dj., Berdiev O.V. Use of cefixime in the treatment of periodontal disease in industrial employees // Farmaecutil journal №3, 2023 P. 77-80 UDK: 616.314.18-002.4-885:615.331:323.329
18. Nortaev A.B., Usmanov R.Dj., Ibragimova Sh.A. Severe Consequences of the Development of Periodontal Disease in the Example of Employees Working in Light Industrial Plants // Texas Journal of Medical Science ISSN NO: 2770-2936 <https://zienjournals.com> Date of Publication: 06-05-2023 P- 110-113
19. Nortaev A.B., Usmanov R.Dj., Berdiev O.V. Periodontal disease and its complications in 21-30-year-old chemical paint workers // Journal of oral medicine and craniofacial research Samarkhand - 2023. P.-21
20. Nortaev A.B., Akhmedova S.M., Usmonov R.Dj. Periodontal disease and its development in the case of employees of chemical shops // Uzbek journal of case reports Part 3. Samarkhand - 2023. P.-130
21. Nortaev A.B., Usmanov R.Dj., Rajabov B.M. The level of periodontal disease in 20-28-year-old textile industry workers // 77th International Scientific and Practical Conference "Achievements of Fundamental, Applied Medicine and Pharmacy". Samarkhand - 2023. P.-525
22. Nortaev A.B., Usmanov R.Dj., Gulmanov I.Dj. Etiology of the development of periodontal disease in workers of the manufacturing industry // "Current aspects of the pathogenesis of diseases caused by environmental factors" Materials of international scientific and practical conference Tashkent – 2023. P-11-12