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PHYSIOLOGY OF HUMAN DIGESTION: MORPHOFUNCTIONAL PRINCIPLES, REGULATION, DISEASES, AND CLINICAL SIGNIFICANCE

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INTRODUCTION

The physiology of digestion is one of the fundamental disciplines of medical science. It studies the mechanisms of food intake, mechanical and chemical processing, nutrient absorption, and the excretion of metabolic end products. The digestive system provides the body with energy, structural materials, and regulatory substances necessary for normal life activity, growth, and the maintenance of homeostasis.

The relevance of studying the digestive system is due to the high prevalence of gastrointestinal diseases, which occupy a leading position among causes of morbidity. Disruptions in the physiological mechanisms of digestion underlie gastritis, peptic ulcer disease, pancreatitis, liver disorders, cholecystitis, colitis, and dysbiosis.

A deep understanding of digestive processes is essential not only for theoretical medicine but also for clinical practice. It allows proper interpretation of pathological changes, selection of appropriate methods of diagnosis, prevention, and treatment, as well as the formulation of evidence-based recommendations for a healthy lifestyle.

MAIN PART

1. Morphofunctional Organization of the Digestive System

The human digestive system is a complex anatomical and functional system that includes the oral cavity, pharynx, esophagus, stomach, small and large intestines, and accessory glands — salivary glands, liver, and pancreas. Each part performs specific functions, ensuring the continuity of digestive processes.

2. Oral Cavity and Salivation

In the oral cavity, initial mechanical processing of food occurs, and the food bolus is formed. Saliva contains amylase, maltase, mucin, and lysozyme. It moistens food, facilitates swallowing, activates enzymatic processes, and provides protective effects on the mucosa.

3. Swallowing and Esophagus

Swallowing is a complex reflex process, including oral, pharyngeal, and esophageal phases. The esophagus ensures food transport to the stomach via peristaltic contractions controlled by the nervous system

4. Stomach and Gastric Digestion

The stomach serves as a reservoir, has motor and secretory functions. Gastric juice contains hydrochloric acid, pepsin, and mucus. The acidic environment denatures proteins, kills microorganisms, and creates optimal conditions for enzyme activity.

5. Liver and Bile

The liver synthesizes bile, which emulsifies fats and facilitates absorption of fat-soluble vitamins (A, D, E, K). Bile also activates lipase and contributes to detoxification.

6. Pancreas

The pancreas secretes pancreatic juice containing trypsin, chymotrypsin, amylase, and lipase, which break down proteins, carbohydrates, and fats, completing chemical digestion.

7. Small Intestine and Absorption

The small intestine is the main site for the completion of digestion and nutrient absorption. Villi and microvilli greatly increase surface area. Nutrients are absorbed into the blood and lymph via diffusion, active transport, and osmosis.

8. Large Intestine and Microbiota

The large intestine regulates water and electrolyte absorption and forms fecal matter. Gut microbiota synthesize B and K vitamins, support immunity, and inhibit pathogenic microorganisms.

9. Neurohormonal Regulation

Digestive processes are regulated by the central and autonomic nervous systems, as well as gastrointestinal hormones (gastrin, secretin, cholecystokinin, motilin, somatostatin). This ensures coordinated organ function depending on food composition and quantity.

10. Digestive System Diseases

Common diseases include gastritis, peptic ulcer disease, gastroesophageal reflux disease, pancreatitis, hepatitis, cholecystitis, colitis, and dysbiosis. Pathogenesis involves disturbances in secretion, motility, microbiota, and neurohormonal regulation.

11. Diagnostic Methods

Diagnostics include:

Esophagogastroduodenoscopy (EGD), colonoscopy

Ultrasound (US), X-ray, CT, MRI

Laboratory tests (blood, stool, enzymes)

Biopsy if necessary

12. Prevention and Treatment

Prevention: rational diet, proper meal timing, avoidance of harmful habits, and stress reduction.

Treatment: diet therapy, medications (enzymes, probiotics, antacids), physiotherapy, and surgical interventions if complications occur.

CONCLUSION

The physiology of digestion is a fundamental field of medicine. Proper functioning of the gastrointestinal tract ensures energy and plastic metabolism, immune protection, and homeostasis. Disorders in digestive processes lead to systemic changes and reduce quality of life.

A comprehensive study of physiological processes allows early detection of pathologies, the use of modern diagnostic, preventive, and therapeutic methods, reduces morbidity, and improves population health. The roles of the liver, pancreas, and gut microbiota are particularly important for integrative body function.

Thus, a deep understanding of digestive physiology is necessary for training qualified medical specialists, improving clinical practice, and developing preventive strategies.

REFERENCES

1. Juraeva, M. (2025). PERSONNEL TRAINING BASED ON INNOVATIVE DEVELOPMENT: PEDAGOGICAL APPROACHES AND EDUCATIONAL EFFECTIVENESS. *AMERICAN JOURNAL OF SOCIAL SCIENCE*, *3*(10), 53-64.

2. Tuychieva, O. (2025). MODERN APPROACHES TO THE DEVELOPMENT OF MEDICAL CULTURE: ON THE EXAMPLE OF MEDICAL EDUCATION. *AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE*, *3*(10), 149-159.

3. Akhmedova, U. (2025). DEVELOPMENT OF A MODERN CAREER TRAINING SYSTEM IN THE CONDITIONS OF NEW UZBEKISTAN BASED ON PEDAGOGICAL APPROACHES. *World Bulletin of Education and Learning*, *1*(03), 477-489.

4. Mokhichekhrakhon, M. (2025). DIDACTIC FOUNDATIONS OF SPEECH TECHNIQUE AND PEDAGOGICAL TECHNIQUE IN IMPROVING THE QUALITY OF EDUCATION. *AMERICAN JOURNAL OF EDUCATION AND LEARNING*, *3*(10), 488-498.

5. Abdurahimova, M. (2025). SUKUT PSIXOFIZIOLOGIYASI. *Farg'ona davlat universiteti*, (1), 72-72.

6. Nodira, U. (2022). THE ROLE OF STORY-BASED LEARNING APPROACH IN ENGLISH LANGUAGE TEACHING. *Science and Innovation*, *1*(7), 375-378.

7. Ulugbek, S., & Nigora, S. (2025). Education and Pedagogical Innovations: Modern Directions in the Development of Science. *Spanish Journal of Innovation and Integrity*, *48*, 142-148.

8. Isroilova, S. (2025). INNOVATIVE ACTIVITY IN MODERN EDUCATION: PEDAGOGICAL TECHNOLOGIES AND FACTORS OF PROFESSIONAL COMPETENCE. *World Bulletin of Education and Learning*, *1*(02), 152-163.

9. Мадаминов, А. А. (2024). РОЛЬ ИННОВАЦИОННО-ТЕХНОЛОГИЧЕСКИХ СРЕДСТВ В ПРОЦЕССЕ КОММУНИКАЦИИ. *Экономика и социум*, (5-1 (120)), 1381-1384.

10. Yusupaliyevna, H. S. (2024). MODEL AND TECHNOLOGY FOR THE DEVELOPMENT OF PROFESSIONAL ABILITIES OF STUDENTS IN MEDICAL EDUCATION. *INNOVATIVE DEVELOPMENTS AND RESEARCH IN EDUCATION*, *3*(28), 399-403.

11. Karimova, M. (2022). BESONDERHEITEN DES FREMDSPRACHLERNENS AN EINER MEDIZINISCHEN HOCHSCHULE WÄHREND DER COVID-19-PANDEMIE. *Архив научных исследований*, *2*(1).

12. Ergasheva, S. P. (2018). Printing activities as a pragmalinguitic functional meaning. *Актуальные проблемы гуманитарных и естественных наук*, (8), 78-80.

13. Komilova, M. (2023). O ‘ZBEK TILIGA XITOY TILIDAN O ‘ZLASHGAN OZIQ-OVQAT NOMLARI TAHLILI. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(20), 54-56.

14. Каxорова, Т. (2022). Tibbiy ta’lim jarayonida ingliz tilini o ‘rgatishda interaktiv didaktik materiallardan foydalanish metodikasini shakllantirish va 3D interaktiv ta’lim dasturi. *Общество и инновации*, *3*(2), 52-55.

15. Muminova, O. (2025). STRENGTHENING MEDICAL CULTURE IN PEDAGOGICAL APPROACHES: INTEGRATION OF EDUCATION, UPBRINGING AND INNOVATION. *AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE*, *3*(10), 202-213.

16. Karimov, A., & Muxammadjonov, X. (2020). Information technologies: Information education and informatics. *Экономика и социум*, (8 (75)), 40-43.

17. Djurayevna, M. M. (2023). The Impact of Non-linguistic Elements on Phonostylistic Changes. *American Journal of Research in Humanities and Social Sciences*, *18*, 153-157.

18. Anvarovich, A. S. (2025). THE ROLE OF MODERN IT TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE IN MEDICINE PRODUCTION PROCESSES. *SHOKH LIBRARY*, *1*(13).

19. Anvarovich, A. S. (2025). MITOXONDRIAL DISFUNKTSIYA VA OKSIDATIV STRESSNING PARKINSON SINDROMI RIVOJLANISHIDAGI O ‘RNI. *PEDAGOGICAL SCIENCES AND TEACHING METHODS*, *6*(51), 17-19.

20. Anvarovich, S. (2025). THE APPLICATION OF MACHINE LEARNING TECHNOLOGIES IN THE ANALYSIS OF ENDOSCOPIC IMAGES. *SHOKH LIBRARY*, *1*(12).

21. Anvarovich, A. S. (2025). THE ROLE AND IMPORTANCE OF MODERN COMPUTER TECHNOLOGIES IN THE DIAGNOSIS AND TREATMENT OF DISEASES RELATED TO THE IMMUNE SYSTEM. *SHOKH LIBRARY*, *1*(12).

22. Anvarovich, A. S. (2025). THE ROLE OF MODERN IT TECHNOLOGIES IN THE DIAGNOSIS AND TREATMENT OF NEUROLOGICAL DISEASES. *SHOKH LIBRARY*, *1*(12).