AMERICAN JURNAL OF ADVANCED SCIENTIFIC RESEARCH
ISSN 2195-1381 Volume- 3 April 2025
https://journal-index.org/index.php/ajasr

THE MUCOUS LAYER OF THE COLON: ANATOMY AND PHYSIOLOGY

Komilova Dildora Alisherovna

CAMU International Medical University,

Assistant Professor of Histology, Cytology and Embryology

Abstract. This article describes in detail the anatomical and physiological characteristics of the mucous membrane of the large intestine. The mucous membrane is an important functional layer of the intestinal wall, consisting of epithelium, crypts, innate immune cells and a muscular network. It performs a number of important functions, such as absorption of water and electrolytes, production of mucus, interaction with microflora and immune protection. The article analyzes the structure and function of these structures from an anatomical and physiological point of view. The importance of pathological changes in the mucous membrane is also emphasized.

Keywords. Large intestine, mucous membrane, epithelium, goblet cells, crypts, water absorption, immune protection, microflora, anatomy, physiology.

The digestive system performs important tasks such as receiving nutrients necessary for life, assimilating them and excreting waste. Each organ in this system has its own function, among which the large intestine is important. As the final link in the digestive process, the colon performs functions such as converting substances that are not useful to the body into waste, reabsorbing water and electrolytes, and maintaining a symbiotic relationship with microflora.

The wall of the colon consists of several anatomical layers, the innermost of which - the mucous layer (tunica mucosa) - is the most functionally active and specialized layer. It protects the body from external factors, ensures fluid balance and immunological stability. Goblet cells, crypts, and lymphoid structures located in the mucous layer are in continuous activity and play an important role in maintaining the health of the body.

This article provides an in-depth analysis of the anatomical structure and physiological function of the mucous layer of the colon from a scientific point of view. It also provides information on its immunological and microbiological significance, as well as changes associated with pathologies.

The mucosa of the colon, in accordance with the general principles of the intestinal wall, consists of several main components:

1. Epithelium The outer part of the mucosa of the colon consists of a single-layered cylindrical epithelium, which is rich in mucin-producing goblet cells. These cells produce a thick alkaline liquid - mucus, which facilitates the absorption of waste products and protects the intestinal wall from mechanical damage.

2. Crypts (glandulae intestinales / cryptae Lieberkühn) are special glandular structures located in the mucosa, in which new epithelial cells are formed. The crypts also contain enteroendocrine cells, which produce hormones and affect intestinal motility.

3. Lamina propria This layer consists of tissues, small blood vessels, lymphatic vessels, and immune cells. It includes the gut-associated lymphoid tissue (GALT). For example, lymphoid follicles (solitary and sometimes Peyer's patches) protect against infections.

4. Muscularis (lamina muscularis mucosae) is a thin layer of smooth muscle located under the mucosa, which controls the activity of the crypts and the distribution of mucous fluid.

The mucous membrane of the large intestine performs various functions. The liquid waste mass that arrives in the intestine hardens mainly as a result of the absorption of water and sodium and chloride ions. Ion channels and pumps (for example, Na^+/K^+-ATPase) on the surface of epithelial cells are actively involved in this process. Mucin produced by goblet cells facilitates intestinal motility and reduces the impact of microorganisms on the wall.

The mucosa has active immune defense mechanisms, maintaining a balance between microflora and pathogens. IgA immunoglobulin is a major component of adaptive immunity and is produced in the mucosa.

Due to the presence of lymphoid tissues, the colonic mucosa acts as the body's "guard" - it fights against pathogens that may enter the body.

Conclusion. The colonic mucosa is a complex structure that performs several vital functions in the body at once. Its epithelial layer serves to maintain fluid balance and the formation of waste mass in the body by absorbing water and electrolytes. The mucus produced by goblet cells is important for protecting the intestinal wall, preventing mechanical damage, and facilitating the excretion of waste.

Also, the lymphoid structures of the mucosa act as the body's local immune system, forming the first line of defense against pathogens. Endocrine cells in the crypts coordinate intestinal motility and secretory activity through hormones. All of these factors are of great importance in ensuring intestinal health and maintaining overall homeostasis.

The information presented in this article will help to better understand the anatomical and physiological characteristics of the colonic mucosa. This will be useful in clinical practice, in particular, in the early detection and effective treatment of pathologies such as inflammatory bowel diseases, dysbiosis, and cancer. Therefore, a correct assessment of the normal structure and function of the colonic mucosa is important for every doctor and biomedical scientist.

References:

1. Sapin M.R., Bryksin Z.G. — Human Anatomy. – M.: Medicine, 2020. – T.2. – 432 p.

2. Bryksin Z.G., Tonkov V.N. — Human Histology. – M.: GEOTAR-Media, 2019. – 448 p.

3. Berezov T.T., Korovkin B.F. — Human Biochemistry. - M.: Medicine, 2020. - 768 p.

4. Sivoglazov V.I. Physiology is the basic anatomy of the human body. - M.: Academy, 2021. - 544 p.

5. Ross M.H., Pawlina W. — Histology: A Text and Atlas. - 8th ed. - Wolters Kluwer, 2020. - 976 p.

6. Moore K.L., Dalley A.F., Agur A.M. — Clinically Oriented Anatomy. - 8th ed. - Wolters Kluwer, 2018. - 1168 p.

7. Gartner LP, Hiatt JL. — Color Textbook of Histology. - 4th ed. - Elsevier, 2013. - 672 p.

8. Tortora G.J., Derrickson B. — Principles of Anatomy and Physiology. – 15th ed. – Wiley, 2017. – 1232 p.

9. Guyton AC, Hall JE. — Textbook of Medical Physiology. - 14th ed. - Elsevier, 2020. - 1152 p.

10. Hayduk V.I. - Immunology kishechnika. - Kyiv: Zdorov'ya, 2018. - 256 p.

11. Khamroev T.Kh., Hoshimov B.Kh. - Normal anatomy. - T.: Tib. ed., 2019. – 280 p.

12. Rakhimov J.A. - Human physiology. - Tashkent: Innovation, 2021. - 364 p.

13. Vancamelbeke M., Vermeire S. — The intestinal barrier: a fundamental role in health and disease. Nat Rev Gastroenterol Hepatol. 2017;14(9):521–538.

14. Peterson L.W., Artis D. — Intestinal epithelial cells: regulators of barrier function and immune homeostasis. Nat Rev Immunol. 2014;14(3):141–153.