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MORPHOLOGICAL DEVELOPMENT OF ENDOCRINE CELLS OF THE DUODENUM IN THE EARLY POSTNATAL PERIOD OF LIFE

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ABSTRACT

The article is devoted to studying the formation of duodenal endocrine cells in the early postnatal period. The material of the study was outbred white rats, which were on different types of feeding. The small intestine with normal microflora affects the adequate adaptation of functional systems of various levels of organization, metabolism, normal structure and function of all organs and systems, the body as a whole. It is known that natural, mixed or artificial, definitive nutrition involves the intake of nutrients and a huge number of various microorganisms from the external environment into the intestine. As a result, during the formation of a normal intestinal microbiocenosis, a genetically determined harmonious development of the individual is ensured.

KEYWORDS: ***Homeostasis, adaptation, duodenal microbiocinosis, neuroimmunoendocrine system.***

INTRODUCTION

The formation of intestinal microbiocenosis is significantly influenced by childbirth (natural or caesarean section), microbiocenosis of the birth canal, ecology, drugs, especially antibiotics, nosocomial infection, type of feeding, etc. [2,3,10].

However, until now, the existing ideas about the role and significance of the intestinal microflora in the formation of the duodenum, its neuroimmune-endocrine formations, the functional system external environment-intestinal microbiocenosis-internal environment of the macroorganism, adaptation and regulation of homeostasis in the process of digestion and absorption are fragmentary and contradictory.

MATERIAL AND METHODS

Rats are white outbred at the age of 1,3,7 and 14 days after birth, which were breastfed. Slaughter of animals and taking a piece of the initial section of the jejunum was carried out in accordance with the International Convention for the Protection of Animals used for Scientific Purposes (2003). After appropriate fixation and wiring, obtaining ultrathin sections, the material was viewed in an IEM-100S electron microscope. In the dynamics of age, the activity of hydrolytic enzymes in the homogenate of the mucous membrane of the jejunum was determined by conventional biochemical methods.

RESULTS AND DISCUSSION

In newborn rats, as well as children [6,9,11], before feeding, the mucous membrane of the duodenum is not separated from the submucosa, forms villi of various generations and short rare crypts between them. Formed finger-like villi are expelled by highly prismatic epithelium, have a homogeneous cytoplasm and a wide, up to 1.0 mkm brush border on the apical surface. Goblet cells between them are single, have a characteristic ultrastructure and secretory granules of moderate density in the supranuclear region. Endocrine and neuroreceptor cells are rarely detected, they are at the stage of differentiation. Lymphocytes or other leukocytes are not detected between villi or crypt enterocytes. In the lamina propria of the mucous membrane under the epithelium, single small groups of cells consisting of clusters of lymphoblasts are detected.

In newborn rats (1-3 days), which are in natural vivarium conditions, due to the minimal development and differentiation of cells of the fundic glands of the stomach, pancreatic acini, low hydrolytic-transport function of columnar epitheliocytes of the villi of the duodenum [9], digestion is autolytic and symbiotic, carried out in the intestinal cavity. Insufficiency of mucus production by goblet cells and developing Brunner's glands in the duodenum does not allow practically implementing membrane and membrane digestion in newborn children and rats [9]. Absorption from the lumen of the jejunum into the cytoplasm of villi enterocytes is carried out heterochronously by receptor-mediated endocytosis. This is a perfect mechanism for the adaptation of mammals to natural feeding with breast milk, which is carried out 0.5-1.0 hours after birth, naturally due to the termination of amniotic and placental nutrition in the same receptor-mediated way.

After feeding rat pups, regulatory, protective and other biologically active ingredients in the composition of breast milk already after 3-5 minutes enter the composition of the intestinal chyme and begin to interact with the stalk-like border enterocytes of the villi, plasmolemm receptors between the bases of the microvilli, forming tubulo-vesicular formations. As a result, using the most perfect way to maintain homeostasis of the internal environment of the newborn

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receptor-mediated endocytosis, in a matter of seconds, the plastic, protective and biologically active ingredients contained in breast milk are bound. Transport of plastic, protective and biologically active ingredients from the lumen of the organ to the cytoplasm, to the supranuclear zone, to the structures of the Golgi complex.

In man, the transition from the sterile conditions of his symbiotic development in the mother's womb to the anti-natal ones occurs against the background of continuing close relationships with the mother. Within 1-2 years, its adaptation consists in the formation of neuroimmunoendocrine and other functional systems [1,8] in close relationship with ecology, the properties of numerous microorganisms, dynamic symbiotic relationships with the external environment, a characteristic type of nutrition, digestion, trophology, which have been evolutionarily fixed in in the form of harmonious integration of normal microbiocinosis of the intestine and internal environments, structural and functional adaptation of neuroimmunoendocrine and other body systems, regulation of homeostasis of the internal environment.

On the 1st-3rd day after birth, in the lamina propria of the mucous membrane of the small intestine, mainly mesenchymal and rarely monocyte-like cells, fibroblasts are detected. Blood and lymphatic capillaries are at the stage of formation and growth. Nerve elements, accumulations of lymphoblasts and reticular cells are rarely detected. In the caudal part of the duodenum and ileum, under the epithelium, round or oval formations are detected, consisting of diffusely located lymphoblasts and reticular cells. Among them, mitotically dividing cells are often noted.

In 7 day old rats, along the mucous membrane of the duodenum with normal microflora, the proportion of formed villi and growing crypts, the number and density of endocrine cells in them increases significantly. At the same time, the degree of infiltration of the epithelial layer of villi and crypts by lymphocytes increases. In the lamina propria, the density of nerve fibers, differentiated leukocytes and connective tissue cells, and blood capillaries increases. As the submucosal and muscular layers thicken, the nerve ganglia become larger, the density and degree of differentiation of various nerve cells increase in them. In progressively increasing accumulations of lymphoblasts and reticular cells, monocytes, an emerging network of blood and lymphatic capillaries are detected.

7 days after the birth of rats with normal microflora, both the number of lymphoid formations along the organ and their volume increase. Individual follicles, or nodules, are indistinguishable. With a diffuse arrangement of lymphoblasts and reticular cells in each of the clusters of lymphoid tissue, the absolute number of cells in them increased on average 2 times. Among them, macrophages are found first, which are moderately active and contain polymorphic lysosomes.

Two weeks after the birth of rats along the duodenum with normal microflora in the mucous membrane, the proximodistal gradient of the linear parameters of the villi and crypts becomes more distinct, and the frequency of their neoplasms significantly decreases. In the thickness of the wall of the duodenum, the number of Peyer's patches reaches 10.8±1.6. In each of the accumulations of lymphoid tissue, an intensive increase in the number and density of cells leads to their bulging into the intestinal lumen, pushing the villi and crypts to the periphery. Their luminal surface is lined with a single-layer prismatic epithelium, where border, M and neuroepithelial cells are distinguished, goblet cells are single. The epithelium is infiltrated with lymphocytes at different levels. In the lamina propria and submucosa of the duodenum, in the accumulations of lymphoid tissue of the proximal part of the duodenum, germinative and follicular zones are more often seen in the distal one. Other structural and functional zones do not differ.

Structural and functional formation of the intestine occurs between 3-4 weeks after the birth of rats, when they switch to definitive nutrition. In them, as in sexually mature 3-4 months old animals with normal intestinal microbiocinosis, the duodenal mucosa, consisting of the epithelium of the connective tissue and muscle plates, has a characteristic relief due to the presence of folds, crypts and villi. The structural and functional unit of the duodenal mucosa is the crypt-villus system. It establishes certain dynamic relationships between proliferating, functioning and extruding epithelial cells. Proliferation of epitheliocytes is carried out in the lower half of the crypts. For border and goblet cells, the life cycle is on average 72 hours. The functioning of the border and goblet cells throughout the villi lasts 24-48 hours. The extrusion process can be observed at any level of the villi due to their heterochronous functioning.

CONCLUSION

Based on the study of the duodenal mucosa, the formation after the birth of symbiotic relationships between macro- and microorganisms, the regular introduction of nutrients and biologically active substrates into the body with the aim of the harmonious development of the individual, adaptation and homeostasis of the internal environment of the normal structure and function of internal organs and systems naturally formed in the evolution of the functional system internal macroorganism environment-intestinal microbiocenosis-external environment. Feedback from the peripheral (in the small intestine) and central neuroimmune systems (hypothalamic-pituitary system), symbiotic relationships between membrane dominant and associations of cavitary microsymbionts, optimal conjugation of symbiotic cavitary and membrane, sterile membrane digestion, coupled with absorption into villi enterocytes, provide the most important thing - homeostasis of the internal environment of the macroorganism, adequate adaptation of functional systems of various levels of organization, metabolism, normal structure and function of all organs and systems, the body as a whole.

REFERENCES

1. *Зуфаров К.А., Юлдашев А.Ю. Поджелудочная железа., //Руководство по гистологии. – СПб, 2001.- т.2.- С.115-141.*
2. *Ковальчук Л.В., Ганковская Л.В. Отсутствие прайминта лейкоцитов у новорожденных., //Иммуналогия – 2000.-№ 3-с.12-15.*
3. *Можейко Л.А. Эндокринно – экзокринные взаимоотношения поджелудочной железы: история*

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вопроса. Журнал Гродненского государственного медицинского университета 2007. С 7-11.

4. *Парфенов А. И. Энтерология. М.: Триада, 2002.-702 с.*
5. *Панегин Б.В., Карсакова М. И. Макрофаги: свойства и функция. //Иммуналогия – 2009.-№3- С.241-249.*
6. *Рылова Н.В. Диагностика заболиваний поджелудочной железы у детей. Казань. Проктическая медицина – 2010 г.*
7. *Судаков К. В. Физиология функциональных систем организма. М.:Медицина, 2005.-304 с.*
8. *Терентьев А.А., Гурина А.Е., Микаелян Н.П. Состояние инсулиновых рецепторов при повреждении поджелудочной железы в условиях эксперимента. Москва. Здоровье и оброзование. 2014 г.*
9. *Хавкин А.И. Микрофлора пищеварительного тракта. М.: Фонд социальной защиты, 2006.-416 с.*
10. *Хаитов Р. М. Физиология иммунной системы.М.: ВИНИТИ, 2005- 448с.*
11. *Юлдашев А.Ю., Рахманов Р.Р.,Нишанова А.А. и др. механизм регуляции гомеостаза при всасывании белка из двенадцатиперстной кишики в кровь. // Медицинский журнал Узбекистана – 2009,- № 5.- С. 79-87.*
12. *Юлдашев А.Ю., Кахарова З. А., Юлдашев М. А. и др. Функциональная морфология иммунной системы слизистой оболочки двенадцатиперстной кишики. Ташкент: Янги аср авлоди. – 2008.- 48 с.*