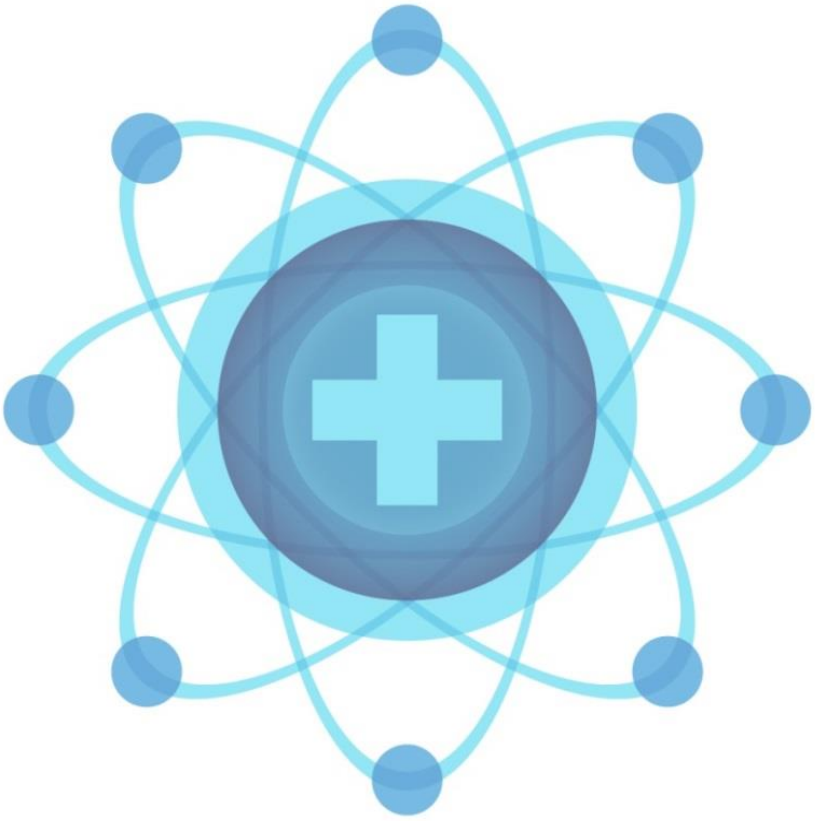

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Morphological characteristics of the small intestine during absorption in the early postnatal period of life.

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Abstract: The article studies the features of the process of breast milk absorption in the early postnatal period. The material of the study was outbred white rats, which were on different types of feeding. The process of absorption in the small intestine is universal and proceeds almost identically up to 14 days after birth when breastfeeding.

Keywords: Nutrition, absorption, breastfeeding, enterocyte, hydrolytic enzymes.

In mammals and humans, the mucous membrane of the small intestine and its immune system begin to form before birth, and their final formation occurs after birth, by the time of transition to final nutrition [1,2,]. The immune system of the intestine at the time of birth is presented in the form of clusters of mesenchymal cells under the epithelium, from which the reticular stroma is formed at the beginning, and then single lymphocytes and their precursors from the vascular bed are populated in it. The lymphoid tissue of the mucous membrane of the small intestine in this period does not have the characteristic features for a sexually mature organism. [3,4,8,11,17].

Currently, large-scale studies are being carried out to study the formation of the immune system of the small intestine mucosa and its adaptive reactions in postnatal ontogenesis. These studies include this research work, which studies the morphological, morphometric, ultrastructural features of development and formation, proliferation and migration parameters of the epithelium of the small intestine mucosa in the dynamics of age in germ-free rats and in sterile rats associated with some representatives of the normal intestinal microflora - lactobacilli . Also in this work, the relationship and integration of epithelial cells of the mucous membrane of the small intestine and its immune system were studied. These studies provide an opportunity to evaluate the morphological, morphometric and ultrastructural features of the development and formation of the stomach, small intestine and large intestine in intact rats.

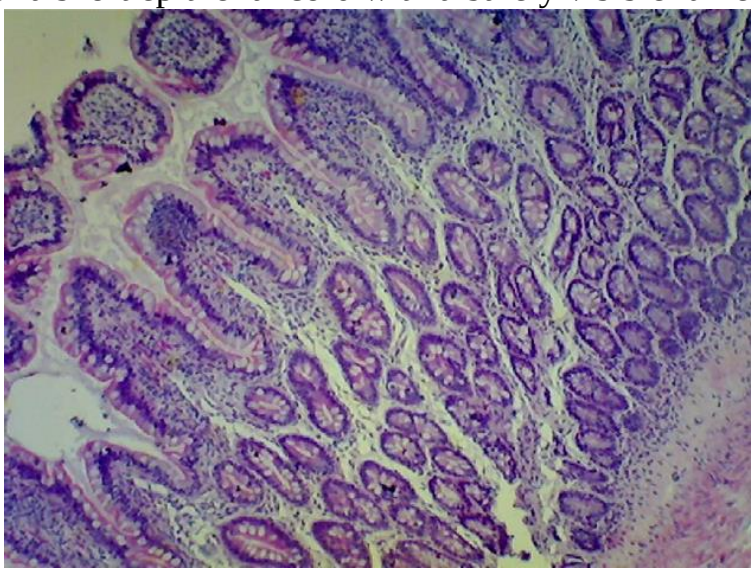
Taking this into account, as well as the fragmentary nature of the ideas about the mechanisms of digestion and absorption in early postnatal ontogenesis, we in this work considered the ultrastructural mechanisms of absorption of food from the small intestine into the blood during natural breastfeeding and the regulation of homeostasis.

Material and research 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 - 100 S 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 .

Research results. At the birth of germ-free rats, the small intestine , like all newborns, is considered sterile. Macroscopically , the small intestine is short and small in diameter. The wall consists of mucous, submucosal, muscular and serous membranes.

The mucous membrane along the entire length of the small intestine has not yet been formed: only the villi that are laid down are short, domed, lined with highly prismatic enterocytes (ect). Crypts are either small depressions formed by accumulations of poorly differentiated epithelial cells (EC) between the bases of the villi, or a short epithelial cord with a barely visible lumen (Fig . 1 A , B).



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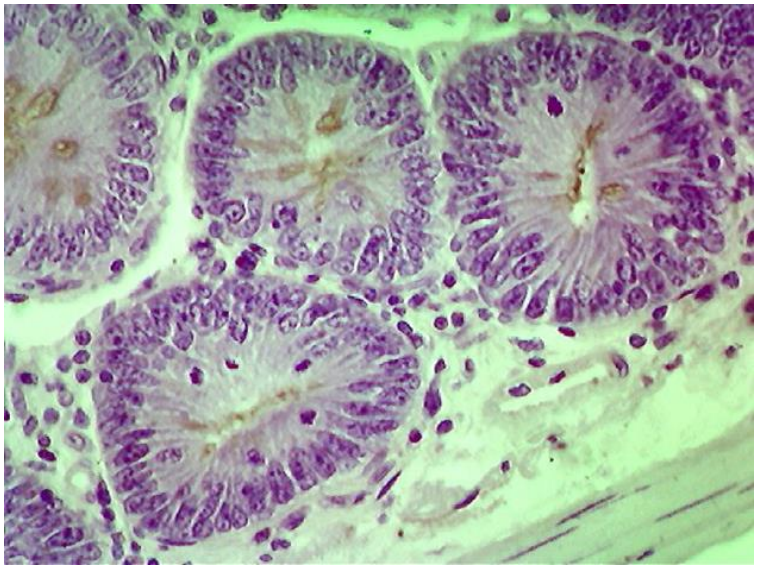

B

Fig.1. The jejunum of a newborn rat in the first hours after birth.
Coloring : Mr. Uv . A - 40, B -100

The epithelial cells of the small intestine usually end their life cycle at the tips of the villus. Before extrusion, the matrix is clarified, the cytoplasm is structureless in places. Individual mitochondria may thicken or swell. The length of orgonella membranes sharply decreases, the terminal network in the apical part of the cells is fragmented, and microvilli undergo vesiculation. At the same time, there is a decrease in the viscosity of the basement membrane, an increase in T-lymphocytes in the epithelial layer, lysis of desmosomes and a dense connective complex.

Extrusion is the process of separating the enterocyte from the surface of the basal lamina and moving towards the lumen of the organ. The 10.0 μm wide space formed in this case is eliminated on average almost instantly due to the upward convergence of the plasma membranes of adjacent viable epitheliocytes. In the space between adjacent cells or under the base of an extruding epithelial cell, 90% of T lymphocytes are usually identified. A destructively changing cell, apparently, is the cause of an increase in the transport of antigen-significant substrates from the intestinal lumen and a violation of homeostasis. Food and its most significant component - microorganisms (indigenous, pathogenic and opportunistic) - after 30 minutes on average after ingestion cause leukocytosis in the circulating blood, in the gastric mucosa, the proximal part of the small intestine an increase of up to 30% on average of lymphocytes, infiltrating mainly epithelial layer of villi.

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