



International Conference on Modern Science and Scientific Studies

Hosted online from Madrid, Spain

Website: econfseries.com

20th June 2025

MORPHOLOGY OF OPEN-TYPE APUDOCYTES OF THE GASTROENTEROPANCREATIC SYSTEM

Dekhkanova Nilufar Tashpulatovna.

Department of Histology, Cytology and Embryology,
Samarkand State Medical University,
Samarkand, Republic of Uzbekistan

Oripov Bekhruz

1st year student of Stomatology department
Samarkand State Medical University
Samarkand, Republic of Uzbekistan

Among the local regulatory structures of organs, the local endocrine apparatus, consisting of endocrine cells singly located among the epithelial cells of the organ mucosa, has recently attracted more and more attention from researchers. The English histologist Pierce discovered a common property of these cells, which consists in the absorption of amine precursors by these cells and their decarboxylation, converting them into peptide hormones or biogenic amines. He combined these cells into a single system, calling it APUD - a system that is, the first letters of the English words "Amine Pecursare Uptake and Decarboxylation" meaning the absorption of amine precursors and their decarboxylation. The cells of this system are called apudocytes, among which there are open and closed type cells. Open type cells face their apical ends into the cavity of the digestive tract, airways and urinary tract. On this apical part there are microvilli, the plasma membrane of which contains specific receptor proteins. These cells receive information about the composition of food or exhaled air. The secretory product of the cell (hormones) is released through the basal part of the plasma membrane, and they have endocrine or paracrine effects. Closed-type cells do not have contact with the external environment, however, like open-type cells, they perform a receptor and effector role, responding to changes in the internal environment of the body. Open-type cells in almost all cases reach the surface of the epithelium with their apical end and often form a thickening there, like the end of a drumstick (2). A certain number of works



International Conference on Modern Science and Scientific Studies

Hosted online from Madrid, Spain

Website: econfséries.com

20th June 2025

are devoted to the study of the morphology and functional changes of these cells in the norm and under various experimental influences (3,4,5,7,8). However, this issue is far from its final solution. If we take into account that in the second half of the twentieth century such nosological units as apudopathies and apudomas appeared, then the study of the morphology of these cells acquires special relevance. Taking into account the above data, we studied the morphology of open-type endocrine cells of the middle section of the digestive tract in some laboratory animals.

The aim of the study: to study the morphology of open-type endocrine cells, the middle section of the digestive tract of rabbits and guinea pigs in the norm and under experimental influences.

Material and methods of the study. The morphology of open-type endocrine cells of the stomach, pancreas and duodenum was studied in 12 guinea pigs and 9 rabbits in the norm and in 4 guinea pigs and 6 rabbits under experimental poisoning with the pesticide karbofos. The experimental poisoning was carried out once, by introducing an aqueous emulsion of the pesticide at a dose of 5 DOC. The animals were killed under sodium ethamine anesthesia. The material was fixed in 12% neutral formalin, which was neutralized with a saturated solution of sodium tetraborate. In this case, part of the material was fixed in a stretched state, and the other part without stretching. During fixation, the formalin reaction was periodically checked with a universal RKS indicator, and the material processing was started at the first shifts in the reaction to the acidic side. One piece of each material was embedded in paraffin using the generally accepted method, and the paraffin sections were impregnated with silver nitrate according to Grimelius. Cryostat sections of another piece of this material were impregnated with silver nitrate according to Bilshovsky-Gross and according to Campos. We also studied cryostat sections from unfixed material using the luminescent-histochemical method by treating the sections with a solution of glyoxylic acid. Such sections were studied under a LUMAM I-3 fluorescent microscope using filters FS 1-4 and FS 1-6. The distribution density of endocrine cells was determined by counting their number on a standard area of the microscope field of view. Statistical processing of the digital



International Conference on Modern Science and Scientific Studies

Hosted online from Madrid, Spain

Website: econfseries.com

20th June 2025

material was carried out using the Moncevicute-Erengene variation statistics method.

Results of the study. A large number of apudocytes are found in the epithelium of the gastric mucosa and duodenum. They are localized in the epithelium of the gastric glands, in the villi and crypts of the intestine, and in the secretory epithelium of the gastric glands themselves. Most apudocytes are cone-shaped and reach the surface of the epithelium with their narrow apical end. When the cell cytoplasm is filled with secretory mass, its apical part forms a thickening in the form of a drumstick and often protrudes slightly onto the surface of the epithelium. The average area of open type apudocytes in rabbits is on average , and in guinea pigs . As can be seen, the sizes of the longitudinal section of apudocytes in rabbits and guinea pigs do not differ significantly. It should be noted that these cells are not always located strictly parallel to the epithelial cells, they form some folds and deflections, as a result of which fragments often get onto the preparation. These fragments can be considered as closed-type apudocytes. To eliminate this factor, we examined serial sequential preparations of the organ under study. When examining the micropreparation of control animals, some polymorphism of apudocytes is observed both in form and in the degree of impregnation. The argyrophilic secretory product contained in their cytoplasm is mainly impregnated. Consequently, the degree of impregnation depends on the amount of this product.

In experimental poisoning of animals with a pesticide in the early stages (1-3 days), apudocytes of the stomach react by blocking the extrusion of the secretion. They are impregnated more intensively. The secretory material in their cytoplasm acquires a high density. The basal part of the cells expands. An eccentric arrangement of their nucleus is noted. Due to the block of extrusion, apudocytes are intensively impregnated and the entire population of apudocytes is revealed. This creates the impression that their number increases. In fact, due to the retention of secretory material from the cytoplasm, those cells that are usually not visible after complete extrusion of their secretion will also be detected. The relative area of apudocytes increases reliably. Thus, open-type apudocytes of the stomach of laboratory animals are the first of the regulatory structures to react to extreme effects. At the same time, in the early stages, the extrusion of their secretory material is blocked, and this



International Conference on Modern Science and Scientific Studies

Hosted online from Madrid, Spain

Website: econfseries.com

20th June 2025

contributes to the detection of the entire population of apudocytes. This can create a false impression of an increase in their number. At relatively late stages (5-7 days), massive degranulation of apudocytes is observed. The results of our studies allow us to join the opinions of those researchers who consider apudocytes as cells of primary response, notification and protection of the body (5). These data must be taken into account when assessing the results of experimental interventions and in pathology of the digestive tract.

References:

- 1 Блинова С.А. Эндокринный аппарат легких при воспалительных и опухолевых заболеваниях органов дыхания // Регуляторные пептиды и биогенные амины: радиобиол. и онкордиол. аспекты. Обнинск: 1992. - С. 5358.
- 2 Дехканов Т.Д., Блинова С.А., Орипов Ф.С., Дехканова Н.Т. Морфология эндокринных клеток в стенке органов среднего отдела пищеварительного тракта Вопросы морфологии XXI века, Санкт-Петербург, . 2010, стр.119-120
3. Райхлин Н.Т., Кветной И.М., Осадчук М.А. APUD-система (общепатологические и онкологические аспекты). Обнинск: 1993. - С. 7-15, 21-28.
4. Соловьева Г.А. Эндокринные клетки желудка источники полипептидных гормонов. Современное состояние проблемы // Арх. анатомии, гистологии и эмбриологии
- 5.. Яглов В.В., Ломоносова Г.А. Диффузная эндокринная система. Итоги и перспективы исследования // Успехи соврем, биологии. 1985. - № 2. - С. 264-276.
6. Яцковский А.Н., Боронихина Т.В. Эндокриноциты дуоденальных желез у некоторых представителей отряда Приматы // Арх. анатомии, гистологии и эмбриологии. 1991. - № 1.
7. Buchan A.M.J., Polak J.M. The classification of the human gastroenteropancreatic endocrine cells // Invest. Cell. Pathol. 1980. - Vol. 3. - P. 51-71.
8. Sundler F., Hakanson R. Fluorescence histochemical methods for the study of peptide hormone- producing cells // Brain Res. Bull. 1982. - Vol. 9. - P. 107-116.
9. Wlinder E., Westemark P. Argyrophil reactions of endocrine cells in the human fetal pancreas // Acta Endocrinol. 1976. - Vol. 82. - P. 203-242.