

THE STATE OF MELATONIN-POSITIVE-LABELED CELLS OF THE GASTRIC MUCOSA IN RATS OF DIFFERENT SEX AND AGE

Denisuk V. S.

National University of Pharmacy, Kharkiv, Ukraine

leradenisuk@mail.ru

Introduction. In recent years, the role of melatonin in the human body attracts attention of doctors and scientists. This is due to multiple effects of melatonin in the normal functioning of the body: antioxidant, immunomodulatory, and influence at the reproductive system. In mammals the epiphysis is a source of melatonin, the so-called pineal melatonin. It is synthesized from essential for human's amino acids – tryptophan. The rhythm of the production of melatonin by the pineal gland is the circadian character. It is known that in the first years of life synthesis of melatonin in apps increases, and then throughout life is gradually and slowly reduced. The rate of decrease concentration of melatonin in the body is directly correlated with indicators of longevity. It is known that the elderly with deficiency of melatonin have more disease of cardiovascular, nervous, endocrine and other systems with severe course. The content of melatonin in the body caused not only by the secretion pinealocytes, but extra pineal sources of its synthesis, namely: apudocytes of the gastrointestinal tract and lungs, liver, kidney, adrenals. Functionally, all of the cells that produce melatonin belong to the diffuse neuroendocrine system, the universal system of adaptation and maintenance of homeostasis. One of the main sources extra pineal melatonin is enterochromaffin cells of the gastrointestinal tract. There is an assumption that extra pineal melatonin can play a leading role as a signaling molecule paracrine interaction of cells and local coordination of cellular functions, however, the final role of his by this time determined.

The **aim of this work** was to study the number of melatonin-positive-labeled cells (MPLC) of the gastric mucosa in rats of different sex and age.

Materials and methods. The work done on sections of the mucosa of the pyloric stomach of rats of different sex at the age 9 and 20 months, and it corresponds to the human age of 29-30 and 55-56 years. The analysis made by the method of immunohistochemical staining with a primary antibody against melatonin (Biorbyt, UK) and secondary Alexa Fluor 488 conjugated antibodies (Abcam, UK). Nucleus were stained propidium iodide (Sigma, USA). Fluorescence observed on a fluorescence microscope Olympus IX-71 (Japan) at the wavelength for Alexa Fluor 488-519 nm, propidium iodide – 617 nm. Cell count in the samples was carried out with the magnification: ocular lens 10, field lens 40. Analysis of serial sections was performed using software for analysis and image processing ImageJ 1.48a and counted to 1mm². All the interventions and euthanasia of animals were performed in

accordance with the requirements of the bioethics Commission of NUPh and "General ethical principles of experiments on animals" that are consistent with the provisions of "European Convention for the protection of vertebrate animals used for experimental and other scientific purposes" (Strasbourg, 1986) and the Fifth National Congress on bioethics (Kyiv, 2013). The statistical validity was using one-way analysis authentic felt the difference at $p \leq 0.05$. Computer program Statistica 7.0 and Excel was used.

Results and discussion. During the work it was found that MPLC is predominately located in the basal and middle sections of the tubular glands of the coolant and is represented by three types of cells: type 1 – a small cell with a diameter of 3.8-7.6 mcIU, mainly located in the basal area of gastric glands, type 2 – large cells with a diameter from 11 to 17 mcIU without granules in the cytoplasm and type 3 – large cells with granules in the cytoplasm, which occupy the basal and middle part of the gland.

According to the results of counting the number of cells in rats at the age of 9 months found that the number MPLC in the mucosa of males is 720.8 ± 49.4 , females – 828.1 ± 44.5 per 1 mm^2 ($p \geq 0.05$). In the ratio of different cell types cells predominate in type 1 and 2 – 40 and 47% for males and 51 and 35% in females, respectively. With age, changes occur both in the number and ratio of different cell types. In male rats the number of MPLC decreased by 30%, females 26% related to young rats ($p \leq 0.05$). Thus, in males there was an increase of 3 types of cells from 13% to 43%, while females were predominant cell type 2 – 52%.

The presence of cells differing in morphological structure suggests the possibility of different functions in the protection of the in the gastric mucosa damage of various etiologies. Their redistribution with age indicates susceptibility to other diseases associated with aging. The decrease in the number of cells with age is an indicator of atrophic changes in the gastric mucosa over time. The data obtained suggest that the decrease in reparative and antioxidant effects of melatonin, therefore, associated not only with physiological atrophy of the bone, and his extra pineal sources. While the females number MPLC is reduced less in comparison with males, with the difference in the number of cells of different type, which requires further research and analysis.

Conclusions. During the work established that between levels MPLC there are ages and sex difference. Higher level MPLC present in young females. MPLC represented by cells different types which have a different number and ratio in rats of different sex and change with age.