

The Influence of the Inhabited Near-Field Chernobyl APS Zone Contaminated with Radio Nuclides on the Histology Thyroid Gland in a Hedgehog

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Abstracts. The morphogenesis of the thyroid gland is based on the complex histological research of hedgehogs inhabiting deprived ecological areas. It is characterized by the following features: macrofollicular cystic construction, colloid rhage, stomal lipomatosis. The detected histological peculiarities of the thyroid construction (such as macrofollicular cystic construction, colloid rhage, stomal lipomatosis) in hedgehogs inhabiting near-field Chernobyl APS zone contaminated with radionuclides can be considered as a latent dysregulation pathology.

Key words: thyroid gland, radionuclides, hedgehog, histology.

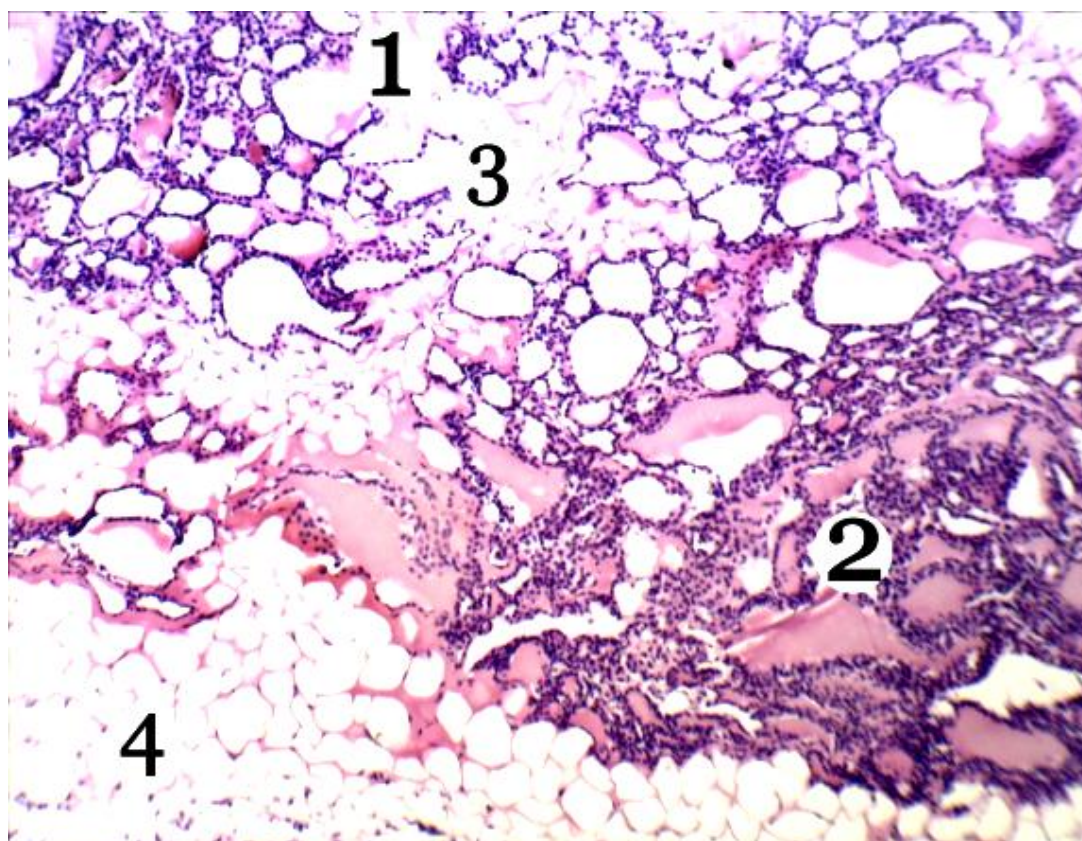
Introduction. Representatives of the insectivorous order (Insectivora) attract attention of specialists of different profiles due to widespread distribution, a variety of morphological and ecological adaptations, an important role in ecosystems [1]. Hedgehogs belong to one of the most ancient orders of placental insectivorous mammals and therefore are of great interest to science. It is likely that in the near future they will become an indicator of the state of the biosystem.

Purpose – to study the histological changes in the thyroid gland of hedgehogs inhabiting near-field Chernobyl APS zone contaminated with radionuclides.

Material and methods. Scientific research uses standard histological methods. Then samples passed in routine histological techniques and parafinized block were prepared. 7 μ histological sections were stained by H&E.

Results and discussion. The histological research of the thyroid gland in hedgehogs from spare territories has detected that parenchyma of the organ is represented by all its typical structural elements. Stroma is a capsule with branching connective septa. Cube-shaped thyrocytes form a wall for every follicle. The nuclei of thyroid epithelium are rounded and are located in the center of cells. The majority of nuclei of thyrocytes contain euchromatin and 2 or sometimes 4 nucleoli, which indicates that the cells participate actively in the processes of protein synthesis. C-cells are located throughout the gland in form of islets – interfollicular position and separately – intraepithelially in the walls of follicles. C-cells are enlogated, oval and polyhedral. Rounded C-cells are rarely found. Their nuclei are frequently oval, less frequently – rounded, and generally a little bigger and

lighter than the ones of thyrocytes. A nucleus contains 1-3 nucleoli. Granules are evenly distributed throughout the cytoplasm of C-cells. The occurrence of follicles in the thyroid gland varies, but small follicles prevail, middle-sized and large adenomeres can be found rarely, they are located under the capsule on the periphery. Usually follicles are partly filled with colloid; they do not adjoin together because of a great number of interfollicular islets. In follicle size it's typical for hedgehogs to have a mixed type of the structure of the thyroid gland.



1 – large devastated follicles, 2 – desquamation and destruction of thyroid epithelium, 3 – growth of connective tissue, 4 – adipose tissue

Picture 3 – Lipomatosis and changes in the goiter of the thyroid in hedgehogs from the exclusion zone (H&E stain, ×100)

Histological research hasn't detected that there is a typical diffuse colloid goiter in the thyroid gland of hedgehogs, inhabiting the exclusion zone. The research demonstrates growth of the thyroid gland through proliferation of follicular epithelium, i.e. in the exclusion zone hedgehogs have a proliferative goiter. The thyroid gland consists of small and large cystic extended follicles that contain desquamative epithelium and colloid. There can be detected the following forms of goiter proliferation: the proliferation of interfollicular epithelium with the formation of papillary structures inside the follicle; intralobular proliferation with the formation of cysts. In the thyroid gland of hedgehogs

there are structural changes of stromal elements in the form of pseudo hypertrophic lipomatosis, which is noted with the atrophy of parenchyma of the thyroid gland. There is a growth of adipose tissue at the locations where thyroid tissue is atrophied – it's between atrophied cloves and in the stroma of the thyroid gland. For hedgehogs it's typical to have 2nd grade of adipocyte excrescence – it means that 30-60% of the thyroid parenchyma is affected.

Table 1 – Morphometric characteristics of the thyroid gland of the hedgehog

Parameters	Habitat areas	
	Bragin region (inhabiting near-field Chernobyl APS zone contaminated with radionuclides)	Vitebsk region (spare territory)
Thyrocyte height, μm	3,80±0,89**	6,76±1,24
Volume of thyrocyte nuclei, μm^3	55,09±3,45	55,24±2,77
Volume of thyrocyte nuclei in immature follicles, μm^3	35,34±3,06	---
Size of normal follicles, μm	---	44,35±2,81
Size of gangiform follicles, μm	81,46±6,30	---

Note: * $p < 0,05$; ** $p < 0,01$; * - in comparison with the spare territory

Thyrocyte height in the gland in hedgehogs from the contaminated area is $3,80 \pm 0,89 \mu\text{m}$, which is 1,78 times less than ($p < 0,01$) in the spare territory. The volume of the nuclei in the thyroid follicular cells hasn't got reliable changes in both habitat areas. The volume of thyrocyte nuclei in immature follicles is $35,34 \pm 3,06 \mu\text{m}^3$, which is 1,56 times less than in the normal ones. The size of gangiform follicles is $81,46 \pm 6,30 \mu\text{m}$, which is almost twice the size of rounded follicles.

Conclusion. The detected histological peculiarities of the thyroid construction – macrofollicular cystic construction, colloid rhage, stomal lipomatosis in hedgehogs inhabiting near-field Chernobyl APS zone contaminated with radionuclides can be considered as a latent dysregulation pathology leading to the formation of a goiter.

Reference.

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