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Current Data on Morphological and Functional Characteristics of the Thyroid Gland in Age Groups

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Annotataion:

The review of the article examines the functional morphology of the thyroid gland, conducted using the morphometric research method. It clearly shows the presence of pronounced dynamics of the morphofunctional state of the thyroid parenchyma associated with age and reflecting the level of functional activity of this endocrine gland, which is determined by the body's needs for its hormones in different periods of its life.

Keywords: thyroid gland; functional morphology; age-related changes; morphometric study.

The thyroid gland is extremely important for the normal functioning of the body [31, 45, 53]. Being extremely sensitive to the effects of factors of the natural and social environment, it serves as one of the central links in the hormonal regulation of adaptive processes in humans [19, 24, 37]. Iodine—containing thyroid hormones thyroxine (T4) and triiodothyronine (T3) are responsible for various and numerous functions of almost all organs and tissues; they affect their morphology, as well as the growth and development of the entire body; they control all types of metabolism, activity of enzyme systems, thermoregulation processes, functions of the central and autonomic nervous system; enhance higher nervous activity; take part in the regulation of the work of other endocrine glands and in adaptive reactions under stress [11, 19, 24, 31, 43]. Their synthesis is regulated by the hypothalamus and pituitary gland, which together with the thyroid gland form the hypothalamic-pituitary-thyroid axis [14, 31, 40, 45, 46, 49, 50, 53]. The neurons of the hypothalamus produce thyrooliberin, the so—called "thyrotropin releasing factor", which stimulates the production of thyroid-stimulating hormone by the adenohypophysis, which, in turn, regulates the synthesis of T4 and T3 [27, 45, 49, 50, 53].

These hormones are produced in the thyroid gland constantly, accumulate in it and are released into the bloodstream as needed [31, 35, 40, 51], that is, in its structure and function, the thyroid gland is a "reserve gland" [13, 35]. Such a mechanism of hormone formation is unique for the endocrine system [13, 40] and is provided by a peculiar structure of thyroid tissue, which differs from that of other endocrine glands. The secretory parenchyma expressing T4 and T3 has a follicular structure. Follicles are formed by follicular (thyroid) epithelium lying on the basement membrane, the so—called "A-cells [13, 27, 35, 42, 44]. Inside the follicles there is a colloid, which is a structureless material containing a special protein — thyroglobulin, which is first subjected to the process of iodization, and then cleavage, after which thyroid hormones are released and released into the blood [27, 30, 31, 35, 40, 44, 51]. Follicle sizes are extremely variable [13, 35, 40], therefore, the thyroid gland may have a different structure — from the microfollicular (the so-called "parenchymal" type),

when the follicular structure is determined only with special coloration of the basement membrane (PAS reaction and/or silver impregnation), and the thyroid epithelium undergoes desquamation and completely fills the lumen follicles devoid of colloid; to macrofollicular (colloidal type), in which giant follicles with a flattened lining epithelium are stretched by a thick basophilic colloid without signs of resorption [29, 30, 34, 35].

The first of these types determines the most pronounced functional activity of the thyroid gland, when iodine-containing hormones are rapidly released into the blood, and their reserves are not created in the intrafollicular colloid. On the contrary, the colloidal type of thyroid tissue structure is inherent in glands with a low level of functioning [12, 21, 30]. There are many intermediate types between the considered marginal types, reflecting the different functional activity of the thyroid gland. The noted correlation of the degree of expression of the secretory function of the thyroid parenchyma with the peculiarities of its histological structure led to the development of a number of morphological criteria that reliably characterize the functional state of the thyroid gland [9, 12, 13, 19, 36-38]. A significant part of these morphofunctional criteria was obtained using the morphometric research method [2-4, 12, 32, 34, 38, 39], meeting the modern requirements of evidence-based medicine [15, 20] and allowing to objectify the results and conclusions, since the final data have quantitative expression and are easily amenable to statistical analysis [2-4, 17]. It is appropriate to note here that the functional morphology of the thyroid gland has been studied most fully in comparison with other organs of the endocrine system. At the same time, such studies of thyroid gland face many and, often, significant difficulties due to the fact that, due to the participation of thyroid hormones in almost all physiological processes in the body, the glandular parenchyma turns out to be very sensitive to the effects of an infinite number of damaging factors, both endogenous and exogenous, causing extreme the diversity of its structure depends on the habitat of the individual, his age and gender, circadian rhythms, etc. [19, 23, 26, 37, 41]. A special place among these factors is occupied by the influence of geographical and geochemical natural conditions, in particular, iodine deficiency in soil and water [29, 40, 41, 47, 48, 52]. The results of studying such effects on the thyroid gland led to the emergence and development of such a section of pathomorphology as geographical (regional) pathology [5-7, 29, 34].

Various aspects of the age morphology of the thyroid gland, both within the framework of the classical descriptive method and from the standpoint of the functional morphological approach, have been studied in sufficient detail in the last century [13, 29, 30, 33, 34, 41], although they continue to attract the attention of modern researchers [1, 10, 25]. At the same time, the ideas of unidirectional age-related involution of the thyroid gland with a decrease in its function [18, 33] were replaced by the concept of adaptive processes in this organ associated with a decrease in total metabolism in an aging body and aimed at leveling the age-related activity of the endocrine glands as an integral endocrine system [22].

When exposed to various exogenous damaging factors, among which drugs, in particular, antipsychotic drugs, play an important role.

Material and methods. The thyroid gland was studied in 30 patients aged 18 to 70 years (men — 16, women — 14) who died in a general hospital from various acute diseases and did not suffer from thyroid diseases during their lifetime (nodular goiter, thyroiditis), which was verified at autopsy.

The material is divided into the following age groups:

I — up to 30 years old (5 people),

II — 31-40 years old (6),

III — 41-50 years old (5),

IV — 51-60 years old (6),

V is 61 years old and older (8).

Histological preparations of thyroid tissue from both lobes of the thyroid gland were made according to a standard technique — paraffin sections, staining with hematoxylin and eosin. With the help of a verified eyepiece micrometer, the diameter of follicles and the height of thyroid epithelial cells were measured in various fields of view. The average values of the indicators were determined from at least 50 measurements. To objectively characterize the functional state of the thyroid gland, the Brown follicular cell index (FCI) was calculated [2, 8, 12]. In addition, the percentage of large, medium and small follicles was calculated by examining at least 100 similar structures in various fields of view of a microscope. The obtained quantitative results were processed statistically using nonparametric statistical methods, which attract the attention of researchers by their simplicity, reliability and high informativeness [16, 28]. At the same time, not only the morphometric parameters of the thyroid secretory tissue by age groups were determined, but also generalized average indicators standardized by age (Σ) were calculated, which can be taken as UN.

Results and discussion. The analysis of age-related morphofunctional changes in the thyroid parenchyma producing iodine-containing hormones reveals certain patterns. The diameter of the follicles undergoes wave-like fluctuations during the aging process. So, before the age of 30 (group I), this indicator is minimal. In the next decade (group II), it increases significantly, and in the range from 41 to 50 years (group III) it decreases statistically significantly. On the contrary, after the age of 50 (groups IV—V), follicle sizes steadily increase compared to all previous periods, reaching a maximum in the V age group. At the same time, the percentage of different types of follicles, ranked by their size, does not change significantly with age. The structure of the studied thyroid glands has, as a rule, a normoplastic structure according to the classification of P.V. Sipovsky (1946) [29] modified by O.K. Khmelnitsky (1973) [34]. At the same time, the height of the thyroid (follicular) epithelium up to 50 years (groups I—III) shows a tendency to increase and then decrease. Moreover, at the age of over 60 years (group V), this indicator is significantly and significantly lower than in all previous observation groups.

Conclusion. The study of the functional morphology of the thyroid gland associated with age, conducted using the morphometric research method, clearly shows the presence of pronounced age-related dynamics of the morphofunctional state of the thyroid parenchyma. The revealed changes reflect the level of functional activity of the thyroid gland, which is determined by the body's needs for its hormones at various periods of its life. The generalized average morphometric indicators obtained as a result of the work carried out, standardized by age, can serve as criteria for UN in the study of changes in the thyroid gland under pathological conditions and under the influence of various damaging factors.

Literature

1. Samixovna, M. K. (2024). Morphologic Changes in Red Blood Cells. *Research Journal of Trauma and Disability Studies*, *3*(3), 178-186.
2. Samixovna, M. K. (2024). MORPHOLOGICAL DATA OF THE ORGANS OF HEMATOPOIESIS AND HEMATOPOIESIS. *Лучшие интеллектуальные исследования*, *14*(5), 66-74.
3. Samixovna, M. K. (2024). MORPHOLOGICAL FEATURES OF POSTPARTUM CHANGES IN UTERINE MEMBRANES. *SCIENTIFIC JOURNAL OF APPLIED AND MEDICAL SCIENCES*, *3*(4), 277-283.
4. Halimova, Y. S. (2023). Morphofunctional Aspects of Internal Organs in Chronic Alcoholism. *AMALIY VA TIBBIYOT FANLARI ILMIY JURNALI*, *2*(5), 83-87.

5. Shokirov, B. S. (2021). Halimova Yu. S. Antibiotic-induced rat gut microbiota dysbiosis and salmonella resistance Society and innovations.
6. Халимова, Ю. С., & Шокиров, Б. С. (2021). Репродуктивность и жизнеспособность потомства самок крыс при различной длительности воздействия этанола. In *Актуальные вопросы современной медицинской науки и здравоохранения: Материалы VI Международной научно-практической конференции молодых учёных и студентов, посвященной году науки и технологий,(Екатеринбург, 8-9 апреля 2021): в 3-х т.*. Федеральное государственное бюджетное образовательное учреждение высшего образования «Уральский государственный медицинский университет» Министерства здравоохранения Российской Федерации.
7. Khalimova, Y. S. BS Shokirov Morphological changes of internal organs in chronic alcoholism. *Middle European scientific bulletin*, 12-2021.
8. Шокиров, Б. С., & Халимова, Ю. С. (2022). ДИСБИОЗ ВЫЗВАННЫЙ АНИБИОТИКАМИ КИШЕЧНОЙ МИКРОБИОТЫ КРЫС И УСТОЙЧИВОСТЬ К САЛМОНЕЛЛАМ. *Scientific progress*, *3*(2), 766-772.
9. Salokhiddinovna, X. Y. (2023). Clinical Features of the Course of Vitamin D Deficiency in Women of Reproductive Age. *EUROPEAN JOURNAL OF INNOVATION IN NONFORMAL EDUCATION*, *3*(11), 28-31.
10. Шокиров, Б., & Халимова, Ю. (2021). Антибиотик-индуцированный дисбиоз микробиоты кишечника крыс и резистентность к сальмонеллам. *Общество и инновации*, *2*(4/S), 93-100.
11. Salokhiddinovna, X. Y. (2023). MORPHOLOGICAL CHANGES IN PATHOLOGICAL FORMS OF ERYTHROCYTES. *EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE*, *3*(11), 20-24.
12. Saloxiddinovna, X. Y. (2023). ERITROTSITLAR PATOLOGIK SHAKLLARINING MORFOLOGIK O'ZGARISHLARI. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *33*(1), 167-172.
13. Шокиров, Б., & Халимова, Ю. (2021). Antibiotic-induced rat gut microbiota dysbiosis and salmonella resistance. *Общество и инновации*, *2*(4/S), 93-100.
14. Шокиров, Б. С., & Халимова, Ю. С. (2021). Пищеварительная функция кишечника после коррекции экспериментального дисбактериоза у крыс бифидобактериями. In *Актуальные вопросы современной медицинской науки и здравоохранения: Материалы VI Международной научно-практической конференции молодых учёных и студентов, посвященной году науки и технологий,(Екатеринбург, 8-9 апреля 2021): в 3-х т.*. Федеральное государственное бюджетное образовательное учреждение высшего образования «Уральский государственный медицинский университет» Министерства здравоохранения Российской Федерации.
15. Salokhiddinovna, X. Y. (2023). Anemia of Chronic Diseases. *Research Journal of Trauma and Disability Studies*, *2*(12), 364-372.
16. Salokhiddinovna, X. Y. (2023). MALLORY WEISS SYNDROME IN DIFFUSE LIVER LESIONS. *Journal of Science in Medicine and Life*, *1*(4), 11-15.
17. Salohiddinovna, X. Y. (2023). SURUNKALI KASALLIKLARDA UCHRAYDIGAN ANEMIYALAR MORFO-FUNKSIONAL XUSUSIYATLARI. *Ta'lim innovatsiyasi va integratsiyasi*, *10*(3), 180-188.
18. Халимова, Ю. С. (2024). КЛИНИКО-МОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ВИТАМИНА D В ФОРМИРОВАНИЕ ПРОТИВОИНФЕКЦИОННОГО

ИММУНИТА. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *36*(3), 86-94.

19. Saloxiddinovna, X. Y. (2024). CLINICAL FEATURES OF VITAMIN D EFFECTS ON BONE METABOLISM. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *36*(5), 90-99.
20. Saloxiddinovna, X. Y. (2024). CLINICAL AND MORPHOLOGICAL ASPECTS OF AUTOIMMUNE THYROIDITIS. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *36*(5), 100-108.
21. Saloxiddinovna, X. Y. (2024). MORPHOFUNCTIONAL FEATURES BLOOD MORPHOLOGY IN AGE-RELATED CHANGES. *Лучшие интеллектуальные исследования*, *14*(4), 146-158.
22. Saloxiddinovna, X. Y. (2024). CLINICAL MORPHOLOGICAL CRITERIA OF LEUKOCYTES. *Лучшие интеллектуальные исследования*, *14*(4), 159-167.
23. Saloxiddinovna, X. Y. (2024). Current Views of Vitamin D Metabolism in the Body. *Best Journal of Innovation in Science, Research and Development*, *3*(3), 235-243.
24. Saloxiddinovna, X. Y. (2024). MORPHOFUNCTIONAL FEATURES OF THE STRUCTURE AND DEVELOPMENT OF THE OVARIES. *EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE*, *4*(4), 220-227.
25. Halimova, Y. S. (2023). Morphological Aspects of Rat Ovaries When Exposed to Caffeine Containing Drink. *BEST JOURNAL OF INNOVATION IN SCIENCE, RESEARCH AND DEVELOPMENT*, *2*(6), 294-300.
26. Халимова, Ю. С., & Шокиров, Б. С. (2022). МОРФОФУНКЦИОНАЛЬНЫЕ ООБЕННОСТИ ВНУТРЕННИХ ОРГАНОВ ПРИ ХРОНИЧЕСКОМ АЛКОГОЛИЗМЕ. *Scientific progress*, *3*(2), 782-789.
27. Халимова, Ю. С. (2021). MORPHOFUNCTIONAL ASPECTS OF THE HUMAN BODY IN THE ABUSE OF ENERGY DRINKS. *Новый день в медицине*, *5*(37), 208-210.
28. Халимова, Ю. С. (2022). МОРФОФУНКЦИОНАЛЬНЫЕ ОСОБЕННОСТИ ЯИЧНИКОВ КРЫС ПРИ ВОЗДЕЙСТВИИ КОФЕИН СОДЕРЖАЩИХ НАПИТОК. *Gospodarka i Innowacje.*, *23*, 368-374.
29. Salokhiddinovna, X. Y. (2023). INFLUENCE OF EXTERNAL FACTORS ON THE MALE REPRODUCTIVE SYSTEM. *EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE*, *3*(10), 6-13.
30. Halimova, Y. S., Shokirov, B. S., & Khasanova, D. A. (2023). Reproduction and Viability of Female Rat Offspring When Exposed To Ethanol. *Procedia of Engineering and Medical Sciences*, 32-35.
31. Salokhiddinovna, H. Y. (2023). Morphological Features of the Human Body in Energy Drink Abuse. *EUROPEAN JOURNAL OF INNOVATION IN NONFORMAL EDUCATION*, *3*(5), 51-53.
32. Халимова, Ю. С., & Шокиров, Б. С. (2022). СОВРЕМЕННЫЕ ДАННЫЕ О МОРФО-ФУНКЦИОНАЛЬНЫХ АСПЕКТОВ ЧЕЛОВЕЧЕСКОГО ОРГАНИЗМА ПРИ ЗЛОУПОТРЕБЛЕНИЕ ЭНЕРГЕТИЧЕСКИМИ НАПИТКАМИ. *PEDAGOGS jurnali*, *4*(1), 154-161.
33. Эргашева, Г. Т. (2023). Исследование Причин Связи Диабета 2 Типа И Ожирения. *Research Journal of Trauma and Disability Studies*, *2*(12), 305-311.

34. Ergasheva Gulshan Toxirovna. (2023). QANDLI DIABET 2-TUR VA SEMIZLIKNING O'ZARO BOG'LIQLIK SABABLARINI O'RGANISH . Ta'lim Innovatsiyasi Va Integratsiyasi, 10(3), 168–173.
35. Ergasheva Gulshan Tokhirovna. (2023). Study of clinical characteristics of patients with type 2 diabetes mellitus in middle and old age. Journal of Science in Medicine and Life, 1(4), 16–19.
36. Saidova, L. B., & Ergashev, G. T. (2022). Improvement of rehabilitation and rehabilitation criteria for patients with type 2 diabetes.
37. Ergasheva, G. (2023). METHODS TO PREVENT SIDE EFFECTS OF DIABETES MELLITUS IN SICK PATIENTS WITH TYPE 2 DIABETES. *International Bulletin of Medical Sciences and Clinical Research*, *3*(10), 104-108.
38. Ergasheva, G. T. (2022). QANDLI DIABET BILAN KASALLANGANLARDA REABILITATSIYA MEZONLARINI TAKOMILASHTIRISH. *TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI*, *2*(12), 335-337.
39. ГТ, Э., & Саидова, Л. Б. (2022). СОВЕРШЕНСТВОВАНИЕ РЕАБИЛИТАЦИОННО-ВОССТАНОВИТЕЛЬНЫХ КРИТЕРИЕВ БОЛЬНЫХ С СД-2 ТИПА. *TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI*, *2*(12), 206-209.
40. Toxirovna, E. G. (2023). O'RTA VA KEKSA YOSHLI BEMORLARDA 2-TUR QANDLI DIABET KECHISHINING KLINIKO-MORFOLOGIK XUSUSIYATLARI. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *33*(1), 164-166.
41. Эргашева, Г. Т. (2023). Изучение Клинических Особенностей Больных Сахарным Диабетом 2 Типа Среднего И Пожилого Возраста. *Central Asian Journal of Medical and Natural Science*, *4*(6), 274-276.
42. Toxirovna, E. G. (2024). GIPERPROLAKTINEMIYA KLINIK BELGILARI VA BEPUSHTLIKKA SABAB BO'LUVCHI OMILLAR. Лучшие интеллектуальные исследования, 14(4), 168-175.
43. Toxirovna, E. G. (2024). QANDLI DIABET 2-TUR VA O'LIMNI KELTIRIB CHIQARUVCHI SABABLAR. Лучшие интеллектуальные исследования, 14(4), 86-93.
44. Dilmurodovna, T. D. (2024). DIABETES MELLITUS IN CENTRAL ASIA: PROBLEMS AND SOLUTIONS. *Лучшие интеллектуальные исследования*, *12*(4), 204-213.
45. Тогайдуллаева, Д. Д. (2024). ОБЩИЕ ОСОБЕННОСТИ ТЕЧЕНИЕ САХАРНОГО ДИАБЕТА В СРЕДНЕЙ АЗИИ. *Лучшие интеллектуальные исследования*, *12*(4), 193-204.
46. Tog'aydullaeva, D. D. (2024). GIPERTENZIYA BOR BEMORLARDA MODDALAR ALMASINUVINING BUZULISHI BILAN KELISHI. *Лучшие интеллектуальные исследования*, *14*(4), 130-137.
47. Dilmurodovna, T. D. (2024). FACTORS CAUSING ESSENTIAL HYPERTENSION AND COURSE OF THE DISEASE. *Лучшие интеллектуальные исследования*, *14*(4), 138-145.
48. Dilmurodovna, T. D. (2024). PREVALENCE INDICATORS OF ARTERIAL HYPERTENSION IN THE POPULATION. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *41*(4), 78-87.
49. Тогайдуллаева, Д. Д. (2024). ИШЕМИЧЕСКАЯ БОЛЕЗНЬ СЕРДЦА, МЕТОДЫ ЛЕЧЕНИЯ И ЭФФЕКТИВНОСТЬ ЛЕЧЕНИЯ СТЕНОКАРДИИ. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *39*(5), 107-115.
50. Dildora, T. (2021, June). CHRONIC RENAL FAILURE. In *Archive of Conferences* (pp. 85-89).

51. Tog'aydullayeva, D. D. (2024). MORPHOLOGICAL ASPECTS OF ANEMIA IN SOMATIC DISEASES. *EUROPEAN JOURNAL OFMODERNMEDICINEAND PRACTICE*, *4*(4), 212-219.
52. Irgashev, I. E. (2022). COVID-19 BILAN KASALLANGAN BEMORLARDA ANTIKAOGULYANT TERAPIYANING YANGICHA TAMOILLARI. *BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIY JURNALI*, *2*(12), 462-466.
53. Ergashevich, I. I. (2024). GIPERTONIK KRIZ BILAN KECHAYOTGAN GIPERTONIYA KASALLIGIDA, ASORATLAR YUZ BERISHINI OLDINI OLISHGA QARATILGAN SHOSHILINCH TERAPIYA. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *40*(1), 55-61.
54. Ergashevich, I. I. (2024). SPECIFIC PROPERTIES OF LEVAMICOL OINTMENT. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, *40*(1), 48-53.
55. Irgashev, I. E. (2023). RESPIRATORY DISTRESS SYNDROME. Horizon: Journal of Humanity and Artificial Intelligence, 2 (5), 587–589.