

Modern Methods in the Diagnosis of Autoimmune Thyroiditis

Ergasheva Gulshan Tokhirovna

Assistant of the Department of Clinical Sciences Asian International University, Bukhara, Uzbekistan

Received: 2024, 14, Sep
Accepted: 2024, 15, Sep
Published: 2024, 17, Oct

Copyright © 2024 by author(s) and BioScience Academic Publishing. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).



Open Access

<http://creativecommons.org/licenses/by/4.0/>

Abstract: The main goal of our article is to identify patients with autoimmune thyroiditis and to determine the methods of diagnostic examination using the new method. The importance of the theme is connected with necessity to form common approaches to problems considered in this paper. 3-4% of population suffer from autoimmune thyroiditis. AIT is detected in 20% of elderly women. Lately physicians of many countries note the increase of AIT morbidity among children and teenagers. Nowadays the confirmation of hypothyroidism, high titers of antithyroid antibodies and specific ultrasonic features have the main value for AIT diagnosis. Cytochemical analysis of peripheral blood leukocytes with increased glycogen and lipids amount, acid and alkaline phosphatases activity and decreased cationic proteins level is of certain importance. The main method of AIT therapy is intake of thyroid hormones (L - thyroxin, 1,6-1,8 mkg/kg/d, per os) with replacing aim. There is no purpose to treat AIT with glucocorticoids and surgically, and these methods should be applied only on strict indications.

Keywords: autoimmune thyroiditis, diagnostics.

Autoimmune thyroiditis (AIT) is more common in women aged 40-50 years. The ratio of women to men diagnosed with AIT is 4-15:1. Autoimmune thyroiditis affects approximately 3-4% of the population, and the number of patients increases with age. Autoimmune thyroiditis is found in approximately 20% of elderly women. At the same time, according to epidemiological studies,

the prevalence of hypothyroidism in the UK is 7.8% among men over 60 years of age [15], and among women over 60 years of age it ranges from 3.3% to 20.5%. The frequency of clinically expressed forms of AIT is 1%.

Autoimmune thyroiditis, of which Hashimoto thyroiditis represents the most frequent form, is an inflammatory state of the thyroid gland that results from the interaction between genetic variants that promote susceptibility and environmental factors. High iodine intake, selenium deficiency, pollutants such as tobacco smoke, infectious diseases such as chronic hepatitis C, and certain drugs are implicated in the development of autoimmune thyroiditis, primarily in genetically predisposed people. Long-term iodine exposure leads to increased iodination of thyroglobulin, which increases its antigenicity and initiates the autoimmune process in genetically susceptible individuals. Selenium deficiency decreases the activity of selenoproteins, including glutathione peroxidases, which can lead to raised concentrations of hydrogen peroxide and thus promote inflammation and disease. Such environmental pollutants as smoke, polychlorinated biphenyls, solvents and metals have been implicated in the autoimmune process and inflammation. Environmental factors have not yet, however, been sufficiently investigated to clarify their roles in pathogenesis, and there is a need to assess their effects on development of the autoimmune process and the mechanisms of their interactions with susceptibility genes.

Diagnostics. Clinically, hypertrophic, atrophic, focal and latent forms of autoimmune thyroiditis are distinguished. In the hypertrophic form of AIT, patients complain of an enlarged thyroid gland, difficulty swallowing, weakness, and a feeling of pressure in the neck. Examination reveals diffuse hyperplasia of the thyroid gland. When palpated, it is dense, has a lobular-elastic consistency, and is not fused with the skin. As the disease progresses, the density of the gland increases, and it may become lumpy, with a rocking symptom (when palpating one lobe, the other sways). Thyroid pain occurs in combination with subacute thyroiditis. In 5% of patients with the hypertrophic form, hyperthyroidism is observed, which gives a picture of the so-called 'hasitoksikoz^a'. Patients are concerned about palpitations, feeling of heat, sweating, weight loss, irritability. 'Hasitotoxicosis' has its own characteristics: 1) it proceeds in waves, with periods of worsening and improving; 2) thyrotoxicosis is more treatable than diffuse toxic goiter (DTG); 3) ophthalmopathy is characteristic; 4) it is usually observed at the onset of the disease; 5) relapses of hyperthyroidism are provoked by acute respiratory infections, mental and physical overload, pregnancy, childbirth, abortions. 5) relapses of hyperthyroidism are provoked by acute respiratory infections, mental and physical overload, pregnancy, childbirth, abortions. Subsequently, hypothyroidism gradually develops, manifested by complaints of lethargy, drowsiness, chills, constipation, memory loss, hair loss, sexual dysfunction, hoarseness, facial swelling, weight gain, pastosity, dryness and flaking of the skin, bradycardia, anemia, increased levels of thyroid stimulating hormone (TSH) and decreased triiodothyronine (T3), thyroxine (T4) in the blood.

The thyroid gland in the atrophic form of AIT is not palpable. In this case, the clinical picture of hypothyroidism is determined. The atrophic form develops gradually, over decades. In this case, galactorrhea is possible - amenorrhea due to excess thyroliberin.

The focal form of AIT is characterized by the defeat of one lobe, which becomes small and dense. A puncture biopsy reveals signs of autoimmune thyroiditis in this lobe

In the latent form of AIT, only immunological signs of the disease are detected without clinical manifestations. The thyroid gland is normal in size. The latent form is often combined with nodular goiter.

Depending on the functional state of the thyroid gland, any form of autoimmune thyroiditis may result in euthyroidism, hyperthyroidism (rarely) or hypothyroidism.

Autoimmune thyroiditis has a benign course. However, a combination of AIT and thyroid cancer is possible. Adenocarcinomas and lymphomas of the thyroid gland are extremely rare (10-15%) against the background of AIT.

Currently, the diagnosis of autoimmune thyroiditis is based on the detection of hypothyroidism, the presence of high titers of antithyroid antibodies in the blood, and characteristic signs in an ultrasound examination of the thyroid gland.

In a general blood test, lymphocytosis, monocytosis, leukopenia [5] and an increase in ESR are possible. In a biochemical blood test, in the presence of hypothyroidism, an increase in the content of cholesterol, lipoproteins, and triglycerides is detected. An immunological blood test reveals an increase in the number and activity of T-helpers and T-killers with a decrease in the number of T-suppressors, an increase in the level of immunoglobulins.

Ultrasound examination of the thyroid gland reveals unevenness of its structure with the presence of hypoechoic areas or nodes without a capsule. The cardinal sign of AIT is a diffuse decrease in tissue echogenicity [7]. It should be remembered that the ultrasound method does not allow differentiating between autoimmune thyroiditis and diffuse toxic goiter, since with Diffuse Toxic Goiter there is also a diffuse decrease in echogenicity. Therefore, the conclusion of an ultrasound of the thyroid gland should only contain a statement of the fact of the presence of diffuse hypoechogenicity of the tissue, characteristic of an autoimmune disease of the thyroid gland, but not contain a diagnosis of AIT or Diffuse Toxic Goiter. With the hypertrophic form of AIT, ultrasound reveals an increase in the volume of the thyroid gland. In the atrophic form of AIT, ultrasound examination of the thyroid gland reveals a very small volume of hypoechoic tissue (usually less than 3 cm³).

Percutaneous fine-needle aspiration biopsy of the thyroid gland is performed under ultrasound control. 3-4 areas of the gland should be punctured. The biopsy shows plasma cell and lymphoid infiltration, with the ratio of lymphocytes with small (up to 8 microns) and large (more than 8 microns) nuclei reduced to 4.5 with the norm being at least 7; Ashkenazi-Gürtele oxyphilic cells (large epithelial oxyphilic cells).

Cytological examination of biopsy material in AIT allows one to detect numerous lymphoid cells of varying degrees of maturity (light blast elements reflect the centers of reproduction), plasma cells, variegated^a composition of chronic lymphoid infiltrate (macrophages, histiocytes, less often neutrophils, giant multinucleated cells of the type of foreign body cells), B-cells (scattered, in the form of loose structures, sometimes very polymorphic), a small number of follicular epithelial cells, felt-like structures (fragments of partially destroyed cells located in a filamentous-fibrous substrate), elements of fibrous tissue. Depending on the histological variant of the disease, the components of the cytogram can be presented in various ratios. In special variants of the cytological picture (predominance of one of the components - lymphoid, B-cell, follicular, inflammatory, fibrous) clinical, laboratory and echographical data are of great importance [3]. In the case of a typical clinical picture of AIT, characteristic ultrasound data, high titers of antithyroid antibodies, and the absence of suspicion of a malignant disease of the thyroid gland, a puncture biopsy may not be performed.

Radioisotope scanning of the thyroid gland with technetium or radioactive iodine reveals an increase in its size (in the hypertrophic form), blurred contours, a change in shape (normally - a 'butterfly' shape, in AIT - in the form of a drop), uneven uptake of the radiopharmaceutical with areas of reduced accumulation, and the absence of intense uptake in the center [6]. Sometimes a single cold node is visualized. Thyroid radioiodine uptake may be normal, decreased, or increased. It should be noted that thyroid scintigraphy and radioactive iodine uptake test are of little diagnostic value in cases of suspected AIT. However, the value of these test results increases if a single nodule is detected in the thyroid gland or if thyroid enlargement continues despite treatment with thyroid hormones. In these cases, a fine-needle biopsy of the nodule or enlarging area is performed to exclude a neoplasm.

When studying the content of antithyroid antibodies in the blood, it is most important to determine antibodies to thyroid peroxidase. Antibodies to II colloidal antigen are also often detected. This antigen is a non-iodinated colloid protein and differs from thyroglobulin. It is very rare in DTG.

Antibodies to thyroid-stimulating hormone receptors are detected in 10% of patients. For the purpose of diagnosing AIT, it is recommended to simultaneously determine antibodies to thyroglobulin and the microsomal fraction [6]. Although there is an opinion that from the standpoint of diagnostics and economic benefits, determining Ab to Tg is hardly justified. One study showed that among all patients positive for thyroid antibodies, only Ab to TPO are determined in 64% of cases, and only Ab to TG - in 1%.

Thus, the common practice of determining both types of antibodies does not add diagnostic value to the analysis, but only increases the costs. In a radioimmunological study of the hormonal status in the hyperthyroidism stage, the content of T3, T4 in the blood is increased; with a decrease in thyroid function, the content of thyrotropin (the earliest sign of hypothyroidism) increases, and the level of T3, T4 decreases. An increase in the TSH level over 5 IU/l with a normal concentration of free T4 is regarded as subclinical hypothyroidism, and an increase in the TSH level with a decrease in the level of free T4 is regarded as manifest hypothyroidism. The development of hypothyroidism in the early stages can be confirmed by a test with intravenous administration of 200 mcg of thyrotropin-releasing hormone, in which at the 30th minute a sharp increase in the level of thyroid-stimulating hormone is observed, two or more times exceeding the physiological reaction of thyrotropin to a pharmacological load. In patients with a euthyroid state, the content of T3, T4, TSH in the blood is normal.

Changes in the cytochemical parameters of peripheral blood leukocytes are of particular importance in the diagnosis of AIT. Cytochemical analysis of capillary blood leukocytes in patients with AIT reveals an increase in the amount of glycogen, lipid levels, alkaline and acid phosphatase activity, and a decrease in the content of cationic proteins [11, 12]. An increase in the content of glycogen and lipids in leukocytes in AIT is due to the need for adequate phagocytosis. An increase in the activity of alkaline phosphatase indicates the activation of gluconeogenesis and synthetic processes in the cell. Acid phosphatase is characteristic of young granulocytes, performs a metabolic function in leukocytes, and can serve as an indicator of the tension of intracellular processes. The function of lysosomes, which are characterized by the presence of acid phosphatase, is associated with the process of self-destruction and degeneration, which underlie the cytopathogenic effect of the pathological process. Increasing the activity of this enzyme allows for an increase in the phagocytosis process.

An increase in the activity of acid phosphatase is a sign of acceleration of catabolic processes and the severity of immunopathological reactions in autoimmune thyroiditis. A decrease in the content of cationic proteins in leukocytes in AIT can be associated with their release from cells as a result of the action of immune complexes on leukocytes, which destabilize lysosomal and cellular membranes, which causes suppression of the protective properties of microphages.

Autoimmune thyroiditis is a clinical diagnosis established on the basis of a combination of clinical signs and the results of instrumental and laboratory studies. None of the methods, even the most informative, by itself allows diagnosing AIT. The more clinical, instrumental and laboratory signs of the disease a patient has, the greater the likelihood of AIT.

CONCLUSION. The Association of Endocrinologists has proposed clinical guidelines for the diagnosis of autoimmune thyroiditis in adults [4]:

1. The diagnosis of AIT cannot be made only based on thyroid palpation data, as well as the detection of an increase or decrease in its volume.
2. The 'major^a diagnostic signs, the combination of which allows one to make a diagnosis of AIT, are primary hypothyroidism (manifest or persistent subclinical); the presence of antibodies to thyroid tissue and ultrasound signs of autoimmune pathology.
3. In the absence of at least one of the 'major diagnostic signs, the diagnosis of AIT is only probabilistic.

4. When hypothyroidism (subclinical or manifest) is detected, AIT diagnostics allows one to establish the nature of the decrease in thyroid function, but has practically no effect on the treatment tactics, which involves replacement therapy with thyroid hormones.
5. A puncture biopsy of the thyroid gland is not indicated to confirm the diagnosis of AIT. It is mainly performed as part of a diagnostic search for nodular goiter.
6. A study of the dynamics of the level of circulating antibodies to the thyroid gland in order to assess the development and progression of AIT has no diagnostic or prognostic value.

References:

1. Степанов, В. Г., Тимофеева, Л. А., & Алешина, Т. Н. (2022). Особенности лучевой диагностики подострого аутоиммунного, ассоциированного с COVID-19. In *РАДИОЛОГИЯ–2022* (pp. 167-167).
2. Tokhirovna, E. G. (2024). Relationship of the Functional States of the Thyroid and the Reproductive System in Women under Iodine Deficiency. *Journal of Science in Medicine and Life*, 2(6), 89-94.
3. Toxirovna, E. G. (2024). QANDLI DIABET 2-TIP VA KOMORBID KASALLIKLARI BO'LGAN BEMORLARDA GLIKEMIK NAZORAT. *TADQIQOTLAR. UZ*, 40(3), 48-54.
4. Toxirovna, E. G. (2024). XOMILADORLIKDA QANDLI DIABET KELTIRIB CHIQRUVCHI XAVF OMILLARINI ERTA ANIQLASH USULLARI. *TADQIQOTLAR. UZ*, 40(3), 63-70.
5. Toxirovna, E. G. (2024). DETERMINATION AND STUDY OF GLYCEMIA IN PATIENTS WITH TYPE 2 DIABETES MELLITUS WITH COMORBID DISEASES. *TADQIQOTLAR. UZ*, 40(3), 71-77.
6. Tokhirovna, E. G. (2024). COEXISTENCE OF CARDIOVASCULAR DISEASES IN PATIENTS WITH TYPE 2 DIABETES. *TADQIQOTLAR. UZ*, 40(3), 55-62.
7. Tokhirovna, E. G. (2024). MECHANISM OF ACTION OF METFORMIN (BIGUANIDE) IN TYPE 2 DIABETES. *JOURNAL OF HEALTHCARE AND LIFE-SCIENCE RESEARCH*, 3(5), 210-216.
8. Tokhirovna, E. G. (2024). THE ROLE OF METFORMIN (GLIFORMIN) IN THE TREATMENT OF PATIENTS WITH TYPE 2 DIABETES MELLITUS. *EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE*, 4(4), 171-177.
9. Эргашева, Г. Т. (2024). Эффект Применения Бигуанида При Сахарным Диабетом 2 Типа И Covid-19. *Research Journal of Trauma and Disability Studies*, 3(3), 55-61.
10. Toxirovna, E. G. (2024). GIPERPROLAKTINEMIYA KLINIK BELGILARI VA BERPUSHTLIKKA SABAB BO'LUVCHI OMILLAR. *Лучшие интеллектуальные исследования*, 14(4), 168-175.
11. Toxirovna, E. G. (2024). QANDLI DIABET 2-TUR VA O'LIMNI KELTIRIB CHIQRUVCHI SABABLAR. *Лучшие интеллектуальные исследования*, 14(4), 86-93.
12. Toxirovna, E. G. (2024). QANDLI DIABET 2 TUR VA YURAK QON TOMIR KASALLIKLARINING BEMOLARDA BIRGALIKDA KECISHI. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 38(7), 202-209.
13. Эргашева, Г. Т. (2024). СНИЖЕНИЕ РИСКА ОСЛОЖНЕНИЙ У БОЛЬНЫХ САХАРНЫМ ДИАБЕТОМ 2 ТИПА И СЕРДЕЧНО-СОСУДИСТЫМИ ЗАБОЛЕВАНИЯМИ. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 38(7), 210-218.

14. Эргашева, Г. Т. (2024). СОСУЩЕСТВОВАНИЕ ДИАБЕТА 2 ТИПА И СЕРДЕЧНО-СОСУДИСТЫХ ЗАБОЛЕВАНИЙ У ПАЦИЕНТОВ. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 38(7), 219-226.
15. Toxirovna, E. G. (1788). QANDLI DIABET 2-TUR VA SEMIZLIKNING O'ZARO BOG'LIQLIK SABABLARINI O'RGANISH. *Ta'lim Innovatsiyasi Va Integratsiyasi*, 10 (3), 168–173.
16. Ergasheva Gulshan Toxirovna. (2024). ARTERIAL GIPERTENZIYA KURSINING KLINIK VA MORFOLOGIK JIHATLARI. *Лучшие интеллектуальные исследования*, 12(4), 244–253.
17. Эргашева Гулшан Тохировна. (2024). НОВЫЕ АСПЕКТЫ ТЕЧЕНИЕ АРТЕРИАЛЬНОЙ ГИПЕРТОНИИ У ВЗРОСЛОГО НАСЕЛЕНИЕ. *Лучшие интеллектуальные исследования*, 12(4), 224–233.
18. Ergasheva Gulshan Tokhirovnna. (2024). CLINICAL AND MORPHOLOGICAL ASPECTS OF THE COURSE OF ARTERIAL HYPERTENSION. *Лучшие интеллектуальные исследования*, 12(4), 234–243.
19. Эргашева, Г. Т. (2024). ОСЛОЖНЕНИЯ САХАРНОГО ДИАБЕТА 2 ТИПА ХАРАКТЕРНЫ ДЛЯ КОГНИТИВНЫХ НАРУШЕНИЙ. *TADQIQOTLAR*, 30(3), 112-119.
20. Tokhirovnna, E. G. Studying the Causes of the Relationship between Type 2 Diabetes and Obesity. *Published in International Journal of Trend in Scientific Research and Development (ijtsrd)*, ISSN, 2456-6470.
21. Эргашева, Г. Т. (2024). ФАКТОРЫ РИСКА РАЗВИТИЯ САХАРНОГО ДИАБЕТА 2 ТИПА. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 36(5), 70-74.
22. Tokhirovnna, E. G. (2024). RISK FACTORS FOR DEVELOPING TYPE 2 DIABETES MELLITUS. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 36(5), 64-69.
23. Эргашева, Г. Т. (2023). Исследование Причин Связи Диабета 2 Типа И Ожирения. *Research Journal of Trauma and Disability Studies*, 2(12), 305-311.
24. 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.
25. Ergasheva Gulshan Tokhirovnna. (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.
26. Saidova, L. B., & Ergashev, G. T. (2022). Improvement of rehabilitation and rehabilitation criteria for patients with type 2 diabetes.
27. 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.
28. Ergasheva, G. T. (2022). QANDLI DIABET BILAN KASALLANGANLARDA REABILITATSIYA MEZONLARINI TAKOMILASHTIRISH. *TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI*, 2(12), 335-337.
29. 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.

30. 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.
31. Эргашева, Г. Т. (2023). Изучение Клинических Особенности Больных Сахарным Диабетом 2 Типа Среднего И Пожилого Возраста. *Central Asian Journal of Medical and Natural Science*, 4(6), 274-276.
32. Abdurashitovich, Z. F. (2024). ANATOMICAL COMPLEXITIES OF JOINT BONES OF THE HAND. *EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE*, 4(4), 198-206.
33. Зикриллаев, Ф. А. (2024). АНАТОМИЧЕСКОЕ СТРОЕНИЕ ОРГАНОВ ДЫХАНИЯ И ЕГО ЛИЧНЫЕ ХАРАКТЕРИСТИКИ. *TADQIQOTLAR. UZ*, 40(3), 86-93.
34. Abdurashitovich, Z. F., & Komoliddinovich, S. J. (2024). DIGESTIVE SYSTEM. ANATOMY OF THE STOMACH. *TADQIQOTLAR. UZ*, 40(3), 78-85.
35. Abdurashitovich, Z. F. (2024). Umurtqa Pog'onasi Birlashuvlari. *Tadqiqotlar. Uz*, 40(3), 40-47.
36. Rakhmatova, D. B., & Zikrillaev, F. A. (2022). DETERMINE THE VALUE OF RISK FACTORS FOR MYOCARDIAL INFARCTION. *FAN, TA'LIM, MADANIYAT VA INNOVATSIYA JURNALI/ JOURNAL OF SCIENCE, EDUCATION, CULTURE AND INNOVATION*, 1(4), 23-28.
37. Abdurashitovich, Z. F. (2024). МИОКАРД ИНФАРКТИ UCHUN XAVF OMILLARINING АНАМИЯТИНИ АНИQLASH. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 36(5), 83-89.
38. Abdurashitovich, Z. F. (2024). THE RELATIONSHIP OF STRESS FACTORS AND THYMUS. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 36(6), 188-196.
39. Abdurashitovich, Z. F. (2024). MORPHO-FUNCTIONAL ASPECTS OF THE DEEP VEINS OF THE HUMAN BRAIN. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 36(6), 203-206.
40. Abdurashitovich, Z. F. (2024). АСТРАГАЛ О'СИМЛИГИНИНГ ТИББИЙОТДАГИ МУНИМ АНАМИЯТЛАРИ ВА SOG'LOM TURMUSH TARZIGA TA'SIRI. *Лучшие интеллектуальные исследования*, 14(4), 111-119.
41. Salokhiddinovna, X. Y. (2023). Anemia of Chronic Diseases. *Research Journal of Trauma and Disability Studies*, 2(12), 364-372.
42. Salokhiddinovna, X. Y. (2023). MALLORY WEISS SYNDROME IN DIFFUSE LIVER LESIONS. *Journal of Science in Medicine and Life*, 1(4), 11-15.
43. Salohiddinovna, X. Y. (2023). SURUNKALI KASALLIKLARDA UCHRAYDIGAN ANEMIYALAR MORFO-FUNKSIONAL XUSUSIYATLARI. *Ta'lim innovatsiyasi va integratsiyasi*, 10(3), 180-188.
44. Халимова, Ю. С. (2024). Клинико-Морфологические Особенности Витамина D В Формирование Противовирусного Иммуниета. *Образование Наука И Инновационные Идеи В Мире*, 36(3), 86-94.
45. Saloxiddinovna, X. Y. (2024). CLINICAL FEATURES OF VITAMIN D EFFECTS ON BONE METABOLISM. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 36(5), 90-99.

46. Saloxiddinovna, X. Y. (2024). CLINICAL AND MORPHOLOGICAL ASPECTS OF AUTOIMMUNE THYROIDITIS. *ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ*, 36(5), 100-108.
47. Saloxiddinovna, X. Y. (2024). MORPHOFUNCTIONAL FEATURES BLOOD MORPHOLOGY IN AGE-RELATED CHANGES. *Лучшие интеллектуальные исследования*, 14(4), 146-158.
48. Saloxiddinovna, X. Y. (2024). CLINICAL MORPHOLOGICAL CRITERIA OF LEUKOCYTES. *Лучшие интеллектуальные исследования*, 14(4), 159-167.
49. 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.
50. 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.
51. Saloxiddinovna, X. Y. (2024). Modern Views on the Effects of the Use of Cholecalciferol on the General Condition of the Bod. *JOURNAL OF HEALTHCARE AND LIFE-SCIENCE RESEARCH*, 3(5), 79-85.