International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 3, Issue 11, November - 2024
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

The Expression of The P53 Gene Suppressor in Breast Cancer

B. B. Latipov1
D. A. Nishanov 2
M. A. Gafur Akhunov 3
G. N. Saidov 3
M. T. Tukhtabayeva 3
A. B. Yigitaliev 4
1. Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology, Bukhara Regional Branch
2. Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology, MH RUz
3. Department of Oncology of the Center for the Development of Professional Qualifications of Medical Workers
4. Fergana Medical Institute of Public Health

Abstract

The article examines the indicators of the P53 gene suppressor in the Luminal type of breast cancer, and it has been established that the activity of tumor cells depends on the Luminal type.

According to the results of the conducted study, the P53 index in Luminal A type of breast cancer had a high positive response in 10% of patients, while in Luminal B type (Her-2 negative), a high positive response was observed in 20% of patients. For luminol B (Her-2-positive), this indicator was 40%. In the basal-like (tripple negative) type, the high positive reaction of P53 was 60%. The Her-2 positive (non-luminal) type also showed a high positive response of 90%. As can be seen from the presented data, a high expression of the p53 gene suppressor is observed in luminal breast tumors, which are prognostically unfavourable. This, of course, should be taken into consideration when determining treatment tactics and studying the prognosis of breast cancer.

Keywords: Breast cancer, immunohistochemistry, gene suppressor, tumor Luminal type, prognosis, treatment tactics.

Introduction

Breast cancer, being the most common neurological form of cancer, is diagnosed annually in approximately 2,300,000 people worldwide, with a mortality rate of approximately 200,000 people. Along with the high incidence of this disease in developed countries of the world, there is an increase in this disease in developing countries [5, 3]. In the Russian Federation, more than 66,000 people are diagnosed with breast cancer every year [3,7]. Breast cancer is diagnosed annually among more than 4,400 people in the Republic of Uzbekistan, and according to 2022

statistics, it is 12.2 per 100,000 people. In recent years, immunohistochemical methods have been widely used in the diagnosis and treatment of breast cancer.

Immunohistochemical studies are of great importance for identifying molecular structures in cells, studying cell localization, studying the prevalence or histogenesis of tumor diseases, monitoring these processes in the development of precancerous processes, determining prognostic complications of diseases, stages of tumors and treatment tactics, controlling disease stages and treatment processes, determining risk groups for dynamic growth of tumors [8, 9, 10].

The p53 gene-suppressor controls the course of cell cycle processes, as well as the presence of damage to the genome, which may lead to further development of the pathology. p53-dependent apoptosis is a powerful selector, preventing the accumulation of mutations, and if they have already appeared, p53-dependent apoptosis allows the body to eliminate such potentially dangerous cells. The tumor suppressor gene, in which mutations are found in 50% of all types of cancer. [10] This gene encodes a transcription factor that controls cell entry into the cell cycle. Cells that don't have p53 or don't function properly are incapable of such self-regulation and continue to divide even when they are dangerous to the body. Like all tumor suppressants, p53 controls the normal process of the cell cycle. This is a transcription factor that regulates the cell cycle, and this gene performs the function of inhibiting the formation of malignant neoplasms. [4,1].

Examination of molecular genetic factors using immunohistochemistry significantly reduces diagnostic and tactical errors, thereby improving patient survival rates. [1,2]

The materials and methods of the study

An immunohistochemical study was conducted to analyze various processes. Based on immunohistochemical examination criteria, women with breast cancer were classified into Luminal A type, Luminal B type (Her2-negative), Luminal B type (Her2-positive), Her2-positive (non-luminal type), and Basal-like (triple-negative) types. Ten patients were selected from each group, and the level of perivascular proliferative activity of whole cells in breast cancer was studied using a "Leica" microscope (manufactured in Australia) in the Pathomorphology Department of the Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology.

Research methods and objects: 50 patients with breast cancer treated at the Tashkent Regional Branch of the Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology.

The main goal of the study was to study the histological preparations of patients examined and treated at different stages of breast cancer, the expression of Mast cells in microscopic changes around the cell, and the extent of its influence on tumor progression. The age of the patients with breast cancer studied in the study ranged from 35 to 60 years, with an average of 45 years. Of the 50 patients, 20 were examined during menstruation and 30 during menopause. The disease development period ranged from 1 to 24 months. The initial symptoms of the disease in the examined patients were as follows: 50 (100%) patients had a tumor in the breast, 50 (100%) had a tumor and pain in the breast, 16 (30%) had a deformity in the breast, 17 (36%) had a pulsating pulp in the breast, 17 (36%) had a pulsating pulp, and 16 (35%) of 50 patients had clinically enlarged subcutaneous lymph nodes. Breast cancer was localized in the right breast in 26 (60%)

and in the left breast in 24 (40%) of 50 patients. When compared to the breast quadrant, 23 (46%) are located in the upper pelvic quadrant 10 (20%), the lower pelvic quadrant 5 (10%), the upper inner quadrant 5 (10%), the lower inner quadrant 3 (6%), and the central quadrant 4 (8%).

When breast cancer was palpated, the tumor size ranged from 2.5 cm to 6.5 cm. Analysis of the clinical characteristics of the disease revealed that among 50 patients, T1N0M0-10 (20%), T2N0M0-10 (20%), T1N1M0-10 (20%), T2N1M0-5 (10%), T3N0M0-5 (10%), T3N1-2M0-5 (10%), T4N0M0-3 (6%), and T4N1-2M0-2 (4%).

All patients were diagnosed clinically and morphologically after conducting clinical, ultrasound, mammographic and histological, and immunohistochemical studies.

According to the results of the histological examination, in 50 patients, 30 (60%) were found to have infiltrative intra-breast cancer, 15 (30%) - infiltrative intra-bundle cancer, and 5 (10%) - nonspecific cancer.

The results of the study

Our study investigated the proliferative activity of Mast cells in the vascular wall, the density of their location around the vessels under a microscope in a single field of view of 40°C x 0.65°C. Ten patients were selected from each group based on the criteria.

Patients selected according to groups based on immunohistochemical criteria

No	**Criteria**	**Patients number**
1	Lumminal Type A	10
2	Luminal B Type (Her 2-negative)	10
3	Luminal B Type (Her 2-positive)	10
4	Her 2-positive (non-luminal type)	10
5	Basal like (Three times negative)	10

Luminal type A p53 gene suppressor. Ten patients with breast cancer were selected, and the results obtained in all patients were used to study the extent to which the tumor with tumor protein p53 is a genome suppressor protein, i.e., a protein of nuclear transcription, which is responsible for the course of cellular cycle processes, as well as the degree of damage to the genome, which can lead to further development of the pathology. The results obtained are evaluated in the form of mild, moderate, and severe positive reactions. Of the 10 patients selected, 3 (30%) had a negative reaction, 3 (30%) had a mild positive reaction, 3 (30%) had a moderate positive reaction, and 1 (10%) had a high positive reaction. Immunohistochemical micropreparation under a microscope in our body, the nuclei of malignant tumor cells, consisting of multiple pathological mitoses with hyperchromic nuclei, which are polymorphic in the suture ducts and internal parts of the epithelium of the canal, were stained with a negative reaction in 30% of patients and a low degree (30%). (Fig. 1).

International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 3, Issue 11, November - 2024
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

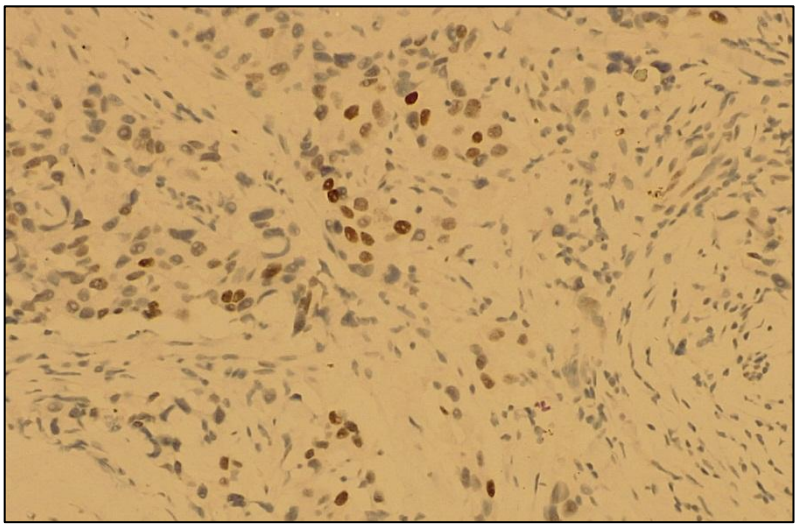

Figure 1. Lulminal type A positive reaction with a p53 level. IGC - Dab is chromogenic. Ob10 x Oc40.

The results of the study show that in this study, 30% of patients with Luminal A type had a negative level of p53 gene suppressor (figure 2).

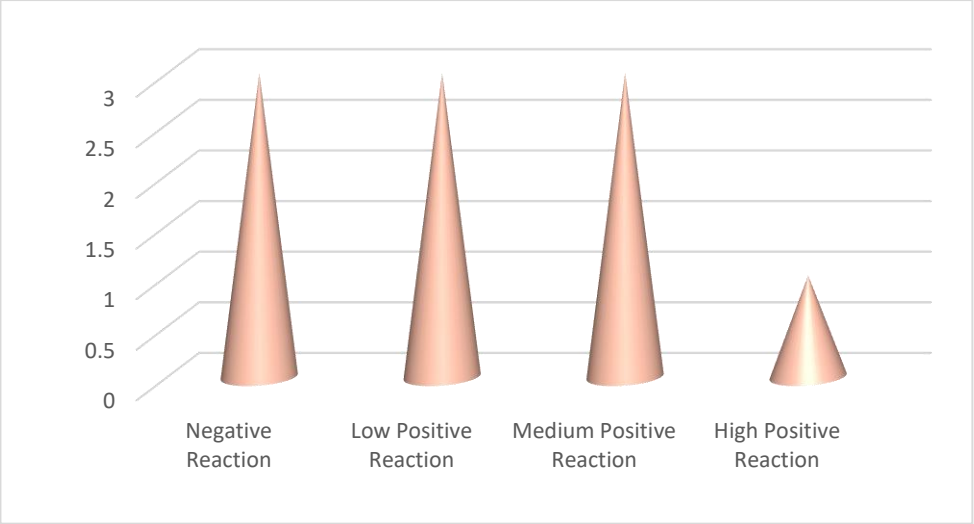

Figure 2. The positive reaction of the p53 gene suppressor with a low level in the lyuminal type A.

Patients with breast cancer diagnosed with type B luminal (negative) type (negative) were additionally studied using the p53 gene suppressor. The results obtained are evaluated in the form of mild, moderate, and severe positive reactions. Of the 10 patients selected, 2 (20%) had a negative reaction, 3 (30%) had a mild positive reaction, 3 (30%) had a moderate positive reaction, and 2 (20%) had a high positive reaction. Immunohistochemical micropreparation under a microscope in our body, the nuclei of malignant tumor cells (50-60%), consisting of multiple pathological mitoses with hyperchromic nuclei polymorphized in the suture and internal parts of the epithelium of the canal, are stained with a low and medium degree of dark brown color (Figure 3).

International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 3, Issue 11, November - 2024
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

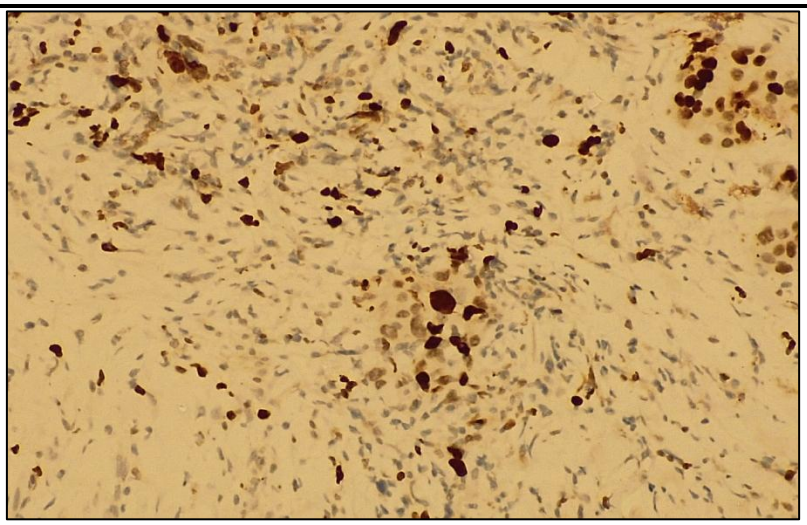

Figure 3. Moderate positive reaction of the p53 gene suppressor in type B luminals (negative). IGC - Dab is chromogenic. Ob10 x Oc40.

The results of the study show that in this study, 60% of patients with luminal type B (negative) had a positive reaction with a low and moderate level of p53 (Figure 4).

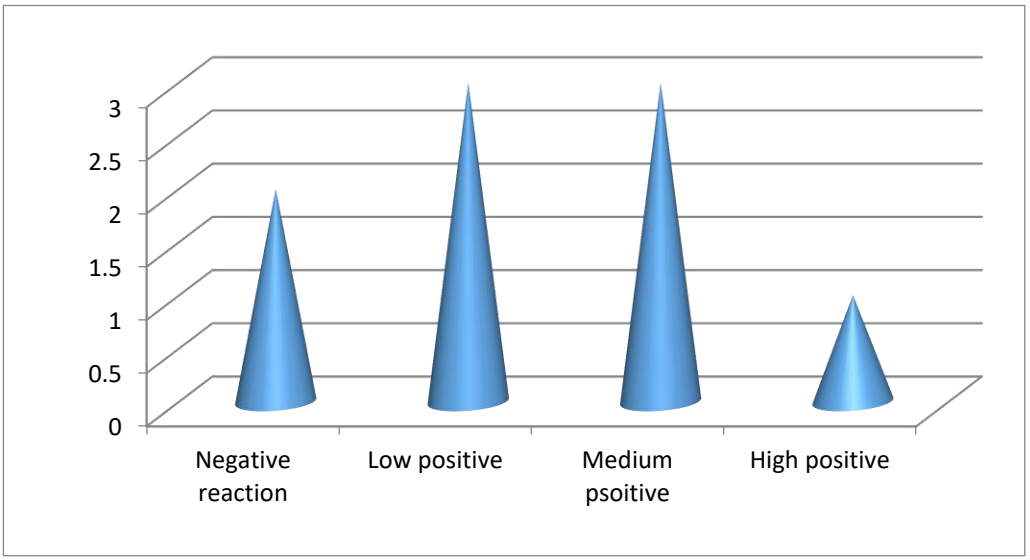

Figure 4. Proliferative activity level of the p53 tumor suppressor gene in Luminal B type (Her 2 - negative) (n=10).

Luminal type B (Her 2 positive) p53 gene suppressor. Ten patients with breast cancer were selected, and the results obtained in all patients were conducted with the aim of studying the course of cellular cycle processes through tumor protein p53, as well as the degree of damage and aggression in the genome, which can lead to further development of the pathology. Of the 10 patients selected, 2 (20%) had a mild positive reaction, 4 (40%) had a moderate positive reaction, and 4 (40%) had a high positive reaction. Immunohistochemical micropreparation under a microscope in our body, nuclei of malignant tumor cells, consisting of multiple pathological mitoses with hyperchromic nuclei, polymorphized in the suture ducts and internal sections of the

epithelium of the canal, are stained with a medium and high degree (80%) of dark brown color. No negative reaction was observed (Figure 5).

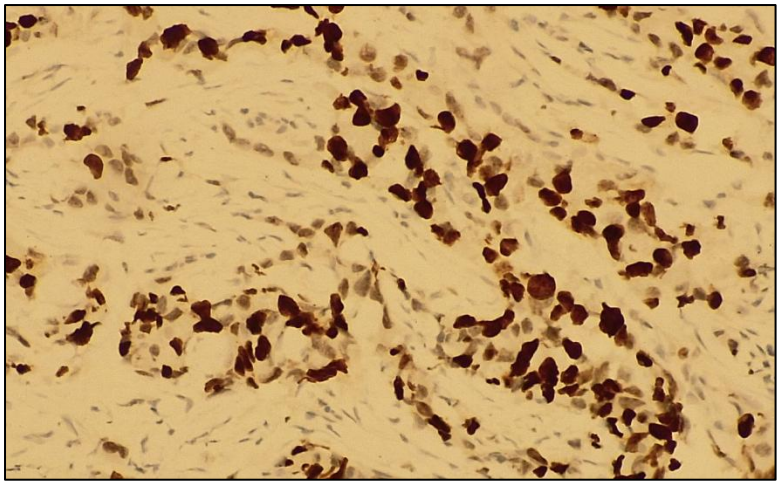

Figure 5. Luminal type B (Her 2 positive) - a positive reaction of the p53 gene suppressor with a high level. IGC - Dab is chromogenic. Ob10 x Oc40.

The results of the study show that in this study, 80% of patients with Luminal B type (Her 2 positive) had a moderate and low level of p53 gene suppression (Figure 6).

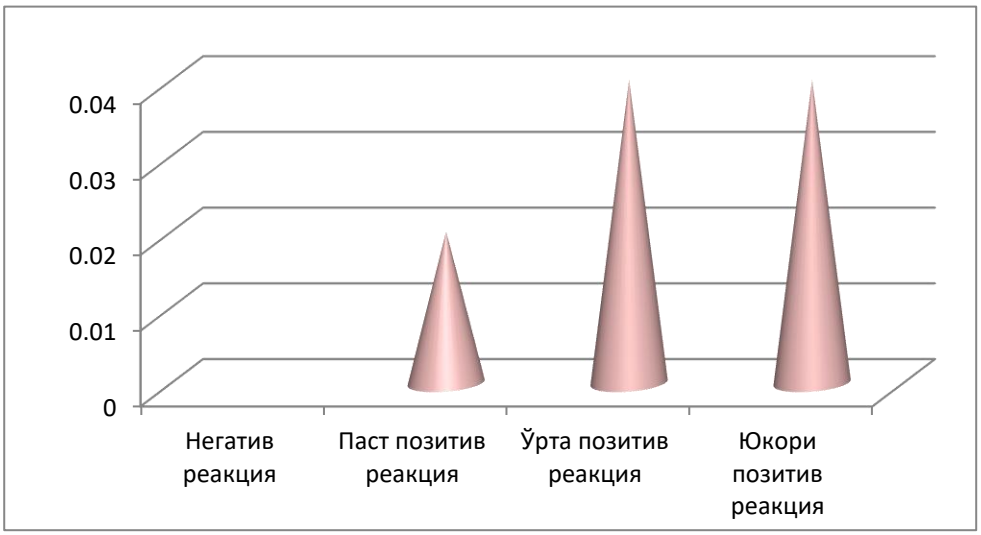

Figure 6. The positive reaction of the p53 gene suppressor in type B luminals (Her 2 positive).

The p53 gene suppressor of the Her 2 positive type (non-luminal type). Ten patients with breast cancer were selected to study the degree of damage to the genome, i.e., the degree of aggression. The results obtained were evaluated in the form of negative, mild, moderate, and severe positive reactions. Of the 10 patients selected, 2 (30%) had a mild positive reaction, 4 (40%) had a moderate positive reaction, and 4 (40%) had a high positive reaction. Immunohistochemical micropreparation was detected under a microscope, and in 80% of patients, the nuclei of malignant tumor cells, consisting of multiple pathological mitoses with hyperchromic nuclei polymorphized in the intestines of the breast and internal parts of the epithelium of the canal, were stained with medium and high dark purple color (Figure 7).

International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 3, Issue 11, November - 2024
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

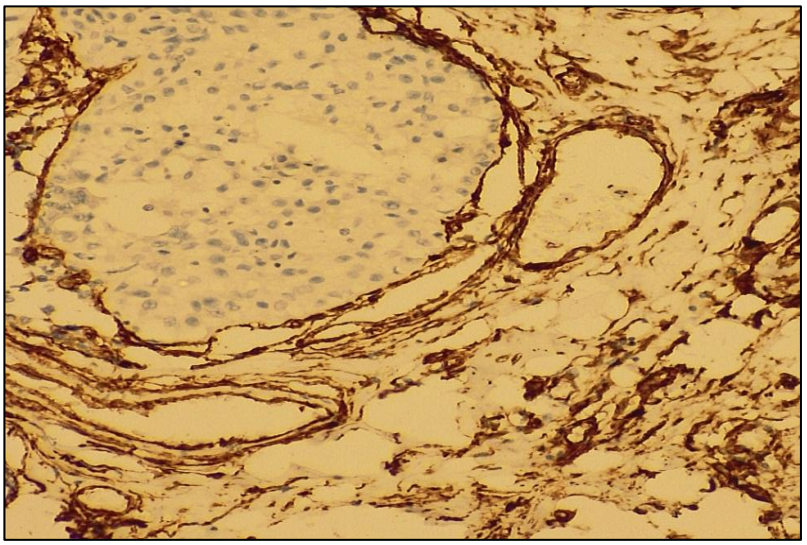

Figure 7. A positive reaction with a high level of the p53 gene suppressor in the Her 2 positive (non-luminal type). IGC - Dab is chromogenic. Ob10. Oc40.

The results of the study show that in this study, 80% of patients with NR2 positive (non-luminal type) were found to have a moderate and high level of p53 gene suppression. No negative reaction was observed (Figure 8).

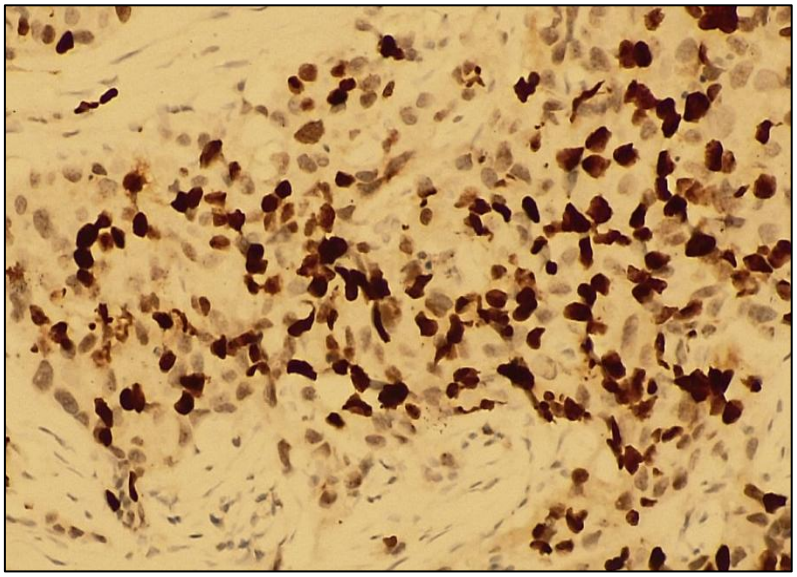

Figure 8. The positive reaction of the p53 gene suppressor in the Her2-positive (nolyminal) type.

International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 3, Issue 11, November - 2024
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

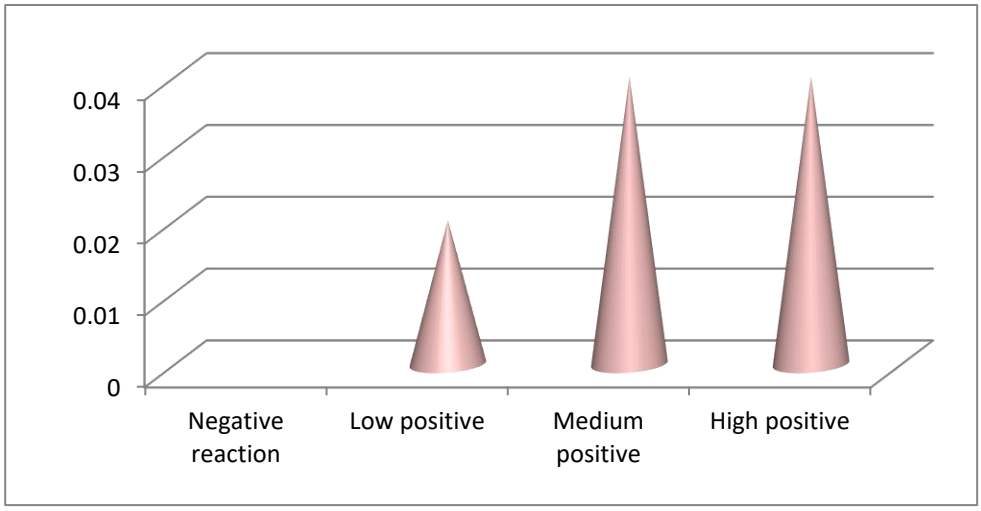

Figure 9. Her 2 (non-luminal type) positive reaction of the P53 gene suppressor

Gene suppressor p53 of the basal-like (tripple negative) type. The study was conducted on 10 patients with breast cancer. The results obtained are evaluated in the form of a negative, mild, moderate, and severe positive reaction. Of the 10 patients selected, 1 (10%) had a mild positive reaction, 3 (30%) had a moderate positive reaction, and 6 (60%) had a high positive reaction. When we examined the immunohistochemical drug under a microscope, the nuclei of malignant tumor cells, consisting of multiple pathological mitoses with hyperchromic nuclei, which are polymorphic in the breast ducts and internal parts of the epithelium of the canal, were stained with a high degree of dark brown color in 60% of patients (Fig. 10).

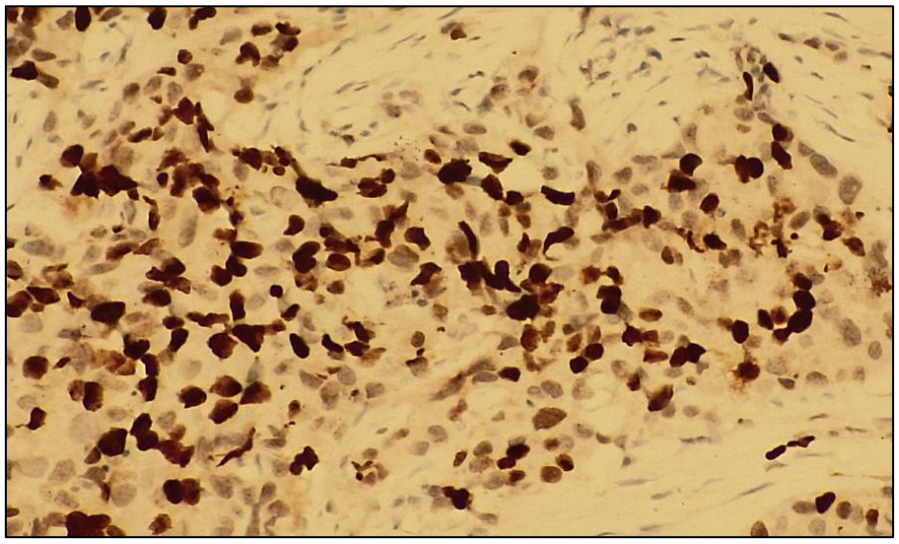

Figure 10. A high-grade positive reaction of the p53 gene suppressor in the basa –like (tripple negative) type. IGC - Dab is chromogenic. Ob10. Ok40.

The results of the study showed that in this study, a high level of p53 gene suppressor was detected in 60% of patients with basal-like (three times negative). No negative reaction was observed.

International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 3, Issue 11, November - 2024
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

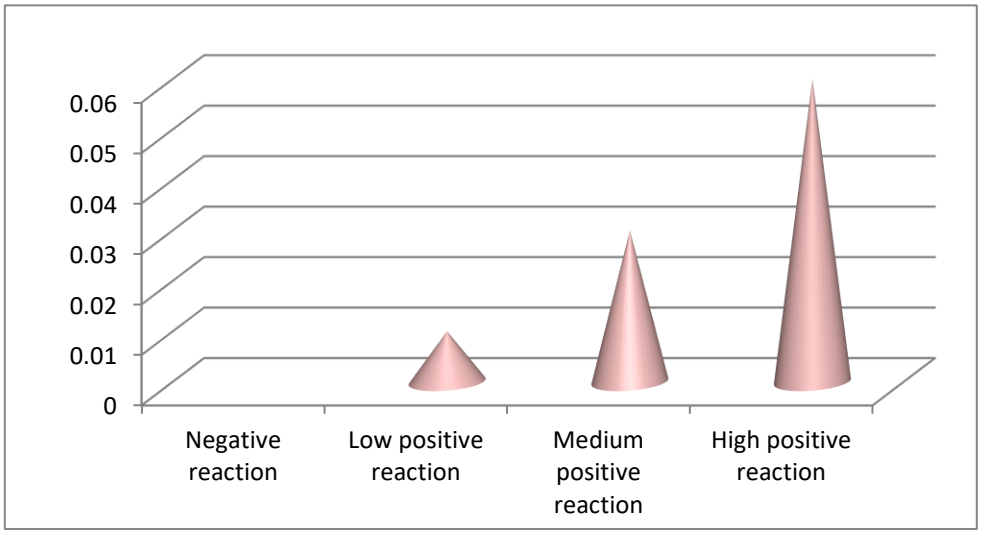

Figure 11. Positive reaction of the p53 gene suppressor in the form of a basal -like (triple negative).

Summary

Of the 10 patients selected for breast cancer with Lullminal type A, 3 (30%) had a negative reaction, 3 (30%) had a mild positive reaction, 3 (30%) had a moderate positive reaction, and 1 (10%) had a highly positive reaction.

Ten patients with luminal type B (negative) were studied. The results obtained were evaluated in the form of mild, moderate, and severe positive reactions. Of the 10 patients selected, 2 (20%) had a negative reaction, 3 (30%) had a mild-to-positive reaction, 3 (30%) had a moderate-to-positive reaction, and 2 (20%) had a high-to-positive reaction. When we examined the immunohistochemical micropreparation under a microscope, the nuclei of tumor cells (50-60%) were stained with dark liver color at low and medium levels. Of the 10 patients selected for the luminal type B (Her 2 positive) type, 2 (20%) had a mild positive reaction, 4 (40%) had a moderate positive reaction, and 4 (40%) had a high positive reaction. As a result, the nuclei of tumor cells were stained with a dark brown color to a medium and high degree (80%). No negative reaction was observed. Of the 10 patients selected for the Her 2 -positive (non-luminal) type, 2 (30%) had a mild positive reaction, 4 (40%) had a moderate positive reaction, and 4 (40%) had a high positive reaction. When we examined the immunohistochemical micropreparation under a microscope, the nuclei of tumor cells in 80% of patients were stained with medium and high levels of dark liver color. Of the 10 patients selected for the basalcymon (triple negative) type, 1 (10%) had a mild positive reaction, 3 (30%) had a moderate positive reaction, and 6 (60%) had a high positive reaction. The nuclei of malignant tumor cells in 60% of patients were stained with a high degree of dark liver color.

References

1. Бош А.Л., Фос С.Н. Изучение СМТ: от иммуногистохимии до молекулярной биологии. Практический подход // Саркомы костей, мягких тканей и опухоли кожи. - 2010. -№1. - С. 24-30.
2. Кешта Р.А. Молекулярно-биологические маркеры как факторы прогноза при саркомах мягких тканей: Автореф. дис. ... канд. мед.наук. -М., 2002. - 27 с.
3. Каприн А.Д. Состояние онкологической помощи населению России в 2019 году/Под ред. А.Д. Каприна, В.В. Старинского, А.О. Шахзадовой - М.: МНИОИ им. П.А. Герцена - филиал ФГБУ «НМИЦрадиологии» Минздрава России, 2020. - илл. - 239 с.
4. Колесник А.Ю. Молекулярно-биологические свойства отечно-инфильтративной формы рака молочной железы / А.Ю. Колесник и др. // Вопросы онкологии. - 2016. - Т. 62, №4. - С.485-489.
5. Рахимова М.Н., Уразаева С.Т., Уразаев О.Н.,егалин Т.Б. Эпидемиология рака молочной железы в странах СНГ и Республике Казахстан (литературный обзор). West Kazakhstan Medical journal 2019;61(1):46-55.
6. TNM: Классификация злокачественных опухолей / Под ред. Дж.Д. Брайерли и др.; пер. с англ. и научн. ред. Е.А. Дубовой, К.А. Павлова. 2-еизд. на русском языке. - М.: Логосфера, 2018. —344 с. Перевод изд. TNM Classification of Malignant Tumours, 8th ed.
7. Федоров В.Э., Ласкано М., Чебуркаева М.Ю. Характеристика распространения рака молочной железы зарубежом (обзор литературы) / Международный научно исследовательский журнал • №4 (46) • Часть 5 •Апрель. С. 138-141. DOI:
8. Mayer, I. A., et al. (2016). Molecular classification of breast cancer: implications for selection of adjuvant chemotherapy. Nature Reviews Clinical Oncology, 13(5), 335-346.
9. Jones, M., Brown, K., & Davis, L. (2019). "Stromal cell changes in diffuse breast cancer." Cancer Research, 27(4), 145-156.
10. А.Р.Бейсенова Роль Иммуногискохимическое исследования в онкологии. Журнал Медицина и экология 2015 г.№2 стр.12-16.
11. Тилляшайхов М.Н., Ибрагимова Ш.Н., Джанклич С. М. Состояние онкологической помощи населению Республики Узбекистан в 2019 году. МЗ РУз, РСНПМЦОиР, Издат. Фан, Академия наук РУз, 2022.
12. Gofur-Okhunov, M. A., Yigitaliyev, A. B., & Karimov, O. M. (2024). Morphological Features and Methods of Treatment of the Diffuse Form of Breast Cancer. International Journal of Alternative and Contemporary Therapy, 2(6), 20-29.