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*Immunomodulatory, immunostimulatory, medicines, analysis, pharmaceutical products, assortment, pharmaceutical market, manufacturing enterprises.*

**Relevance of the Study**

In recent years, based on studies conducted in various countries around the world, new comprehensive approaches for the treatment and prevention of many nosological diseases using immunomodulatory and immunostimulatory medicines have been developed and introduced into clinical practice, taking into account the level of existing immune system disorders [1].

**ANALYSIS OF THE ASSORTMENT OF  
IMMUNOMODULATORY AND IMMUNOSTIMULATORY  
MEDICINES****Elmuradov Dilshod Turdiyevich****Suyunov Nizom Davurovich****Tashkent Pharmaceutical Institute**

E-mail: dilshodelmuradov1984@gmail.com

<https://doi.org/10.5281/zenodo.20203548>**ABSTRACT**

*Based on the data from the "State Register of Medicines, Medical Devices, and Medical Equipment Approved for Use in Medical Practice," an analysis of the assortment of immunomodulatory and immunostimulatory medicines registered in the Republic of Uzbekistan was carried out. According to the research results, the registration indicators of immunomodulatory and immunostimulatory medicines under trade names from foreign countries were 36 in 2021 and 24 in 2025, indicating a decrease of 33.3% (1.5 times) over five years.*

*According to the marketing analysis presented in the scientific studies, medicines imported from CIS countries occupy the leading position in terms of registration. In 2025, out of a total of 74 immunomodulatory and immunostimulatory medicines, 34 (46%) were injection solutions, 12 (16.2%) were tablets, and 7 (9.5%) were suppositories, while other dosage forms accounted for 28.3%.*

*The renewal index of the assortment of immunomodulatory and immunostimulatory medicines was determined to be 8.3%.*

Immunomodulators are biologically active substances that affect the immune system and act in at least two ways: they either enhance immune system functions (immunostimulants) or suppress immune responses (immunodepressants). Another view considers immunomodulators as agents that restore a pathologically altered immune response to a physiological norm [2].

Two types of immunomodulatory effects on the immune system are known:



- The first is specific, through vaccination and activation of adaptive immunity;
- The second is non-specific, through stimulation of cellular functions, primarily innate immunity.

Biological response modifiers or immunomodulators (IMDs) are divided into immunostimulants and immunosuppressants.

Immunostimulants are substances capable of enhancing the body's defense mechanisms. They improve the effector functions of anti-infective immune cells (lymphocytes, macrophages, dendritic cells, NK cells) by strengthening, inducing, or restoring immune protection against infections and shifting the balance toward the production of protective cytokines [3].

Based on the above, studying the use of immunomodulatory and immunostimulatory medicines in medical practice, analyzing the pharmaceutical market and consumption, and conducting marketing

analysis are among the urgent tasks of modern medicine and pharmacy.

### Aim of the Study

The aim of the study was to conduct a marketing analysis of the assortment of immunomodulatory and immunostimulatory medicines based on their registration indicators.

### Research Methods

In the scientific study, data from the "State Register of Medicines, Medical Devices, and Medical Equipment Approved for Use in Medical Practice" of the Republic of Uzbekistan were used, including the 2021 (No. 25), 2022 (No. 26), 2023 (No. 27), 2024 (No. 28), and 2025 (No. 29) editions [4, 5, 6, 7]. In addition, comparative analysis, grouping methods, the assortment renewal index of medicinal products, and marketing analysis methods were applied.

### Results and Discussion

The registration indicators of immunomodulatory and immunostimulatory medicines obtained from the State Register were processed, grouped, and comparatively analyzed.

T/ r	Manufacturers of medicinal products	Years									
		2021		2022		2023		2024		2025	
		number	share, %	number	share, %	number	share, %	number	share, %	number	share, %
1	Local manufacturers	11	10.2	16	15.6	17	16.8	12	14.6	13	17.6
2	Manufacturers from the Commonwealth of Independent States	61	56.5	54	52.4	51	50.5	43	52.4	37	50
3	Foreign manufacturers	36	33.3	33	32	33	32.7	27	33	24	32.4

Table 1



**Analysis of the Number and Share of Registered Immunomodulatory and Immunostimulatory Medicines by Manufacturers**

In Table 1, in 2021, 11 immunomodulatory and immunostimulatory medicines under trade names were registered by local manufacturers, while in 2025 this number increased to 13. Correspondingly, manufacturers from the Commonwealth of Independent States (CIS) registered 61 medicines in 2021 and 37 in 2025, while foreign manufacturers registered 36 medicines in 2021 and 24 in 2025. Overall, over a five-year period, the number decreased by 1.5 times (33.3%).

According to the analysis results, the majority of immunomodulatory and immunostimulatory medicines registered in the State Register were produced by CIS countries.

**Renewal Index**

The renewal index in the pharmaceutical market enables diversification of the assortment of immunomodulatory and immunostimulatory medicines under new trade names and helps identify new market opportunities. At the same time, introducing new trade-name medicines into the pharmaceutical market is always associated with high costs and risks, since new products may not always meet market demand.

The renewal index of the assortment of immunomodulatory and immunostimulatory medicines reflects the share of newly introduced products within the total pharmaceutical assortment. Therefore, such an indicator is used.

The renewal rate (index) (Io) is defined as the share of newly introduced medicines over recent years:

$$I_o = m / M$$

where:

- *m* — number of new medicines
- *M* — total number of medicines in the assortment [9]

According to the analysis, new immunomodulatory and immunostimulatory medicines under new trade names were considered over the five-year period from 2021 to 2025. Accordingly, in 2021 compared to 2022, the renewal index was:

$$I_o = m / M = 3 / 36 = 0.08, \text{ i.e., } 8.3\%$$

In 2023, there were no changes in the number of newly registered immunomodulatory and immunostimulatory medicines under new trade names. In 2024, the number of registered medicines from foreign manufacturers decreased by 9, and in 2025 it decreased by 12.

Table 2

**Registration Indicators of Immunomodulatory and Immunostimulatory Medicines in the State Register by Foreign Countries**

T/r	Countries	Years				
		2021	2022	2023	2024	2025
1	France	-	1	1	1	1
2	Austria	1	1	1	1	2
3	England	-	-	-	-	1
4	Belgium	1	-	-	-	-
5	Vietnam	1	1	1	1	-



6	Mexico	2	-	-	-	-
7	Spain	-	-	1	2	2
8	Iran	1	1	1	1	-
9	Estonia	1	1	-	-	-
10	Slovenia	4	4	4	2	-
11	Thailand	1	1	-	-	-
12	Romania	1	1	1	1	1
13	Finland	1	1	1	-	-
14	Switzerland	1	-	1	1	3
15	Sweden	1	1	1	1	-
16	Germany	7	8	8	5	4
17	Chile	-	-	-	1	1
18	Korea	2	1	1	1	-
19	Italy	3	3	2	2	1
20	Türkiye	2	2	1	1	1
21	China	1	1	1	1	2
22	India	5	5	7	5	5
	Total	36	33	33	27	24

In Table 2, the registration of immunomodulatory and immunostimulatory medicines under trade names from 22 foreign countries was comparatively analyzed. In this context, China had 1 registered medicine in 2021 and 2 in 2025, showing a 50% increase (twofold growth) over five years. In Germany, 7 medicines were

registered in 2021 and 4 in 2025, indicating a 42.8% decrease over five years, corresponding to a 1.75-fold reduction.

Table 3

**Registration Indicators of  
Immunomodulatory and  
Immunostimulatory Medicines by CIS  
Countries**

T/r	Countries	Years				
		2021	2022	2023	2024	2025
1	Republic of Belarus	2	1	1	-	1
3	Republic of Georgia	3	3	3	2	4
4	Ukraine	16	15	14	13	7
5	Russian Federation	40	35	33	28	25

In Table 3, a comparative analysis was conducted on the registration of immunomodulatory and immunostimulatory medicines under trade names from four Commonwealth of Independent States (CIS) countries. In this context, the Russian Federation

accounted for 40 registered medicines in 2021 and 25 in 2025. Over the five-year period, this represents a 37.5% decrease (1.6-fold reduction). Despite the decline, the Russian Federation maintained the leading position in terms of registration indicators for immunomodulatory and



immunostimulatory medicines under trade names.

T/ r	Countries	2021 yil		2022 yil		2023 yil		2024 yil		2025 yil	
		numb er	shar e, %	numb er	shar e, %	numb er	shar e, %	numb er	shar e, %	numb er	shar e, %
1	Medicinal plant preparatio ns	1	0.93	2	1.9	2	1.9	2	2.4	1	1.3
2	Tablets	22	20.4	20	19.4	21	20.8	15	18.3	12	16.2
3	Gel	1	0.93	1	0.97	-	-	-	-	-	-
4	Drops	7	6.5	8	7.8	7	7	5	6.1	4	5.4
5	Aerosol	1	0.93	-	-	-	-	6	7.3	2	2.7
6	Syrup	4	3.7	4	3.9	4	4	4	4.9	3	4.1
7	Spray	5	4.6	5	4.8	6	5.9	-	-	1	1.3
8	Oral solution	3	2.8	1	0.97	-	-	-	-	-	-
9	Supposito ries	8	7.4	8	7.8	8	8	7	8.5	7	9.5
10	Infusion solutions	8	7.4	6	5.8	7	7	5	6.1	6	8.1
11	Capsules	6	5.6	6	5.8	6	5.9	5	6.1	4	5.4
12	Injection solutions	42	38.9	42	40.8	40	39.5	33	40.3	34	46
	Total	108	100	103	100	101	100	82	100	74	100

**Table 4  
Analysis of the Assortment of Immunomodulatory and Immunostimulatory Medicines by Dosage Forms.**

In Table 4, the immunomodulatory and immunostimulatory medicines were classified into 12 groups according to dosage forms under trade names. Regarding dosage forms, tablets accounted for 22 products in 2021 and 12 in 2025, showing a 45.4% decrease over five years (1.83-fold reduction). Injectable solutions accounted for 42 products in 2021 and 34 in 2025, indicating a 19% decrease over five years (1.23-fold reduction).

Based on registration indicators, the largest share of immunomodulatory and

immunostimulatory medicines belongs to injectable dosage forms.

The results of our study suggest that analyzing the registration indicators of immunomodulatory and immunostimulatory medicine assortments in Uzbekistan provides a scientific basis for further research in drug development and production, as well as for the implementation of research findings into medical and pharmaceutical practice.

**Conclusion**

1. According to the results of the comparative analysis, immunomodulatory and immunostimulatory medicines produced in the countries of the Commonwealth of Independent States (CIS) occupy the



leading position in terms of both dosage forms and quantity. It was determined that the majority of immunomodulatory and immunostimulatory medicines registered in the State Register are produced in CIS countries.

2. In 2021, the share of immunomodulatory and immunostimulatory medicines produced by CIS manufacturers was relatively high in terms of both quantity and dosage form groups; however, the share of medicines supplied by foreign and local manufacturers decreased significantly.

3. It was determined that immunomodulatory and immunostimulatory medicines registered in the State Register by foreign countries and CIS countries account for an average of 85% of the total market.

4. It is recommended that local pharmaceutical enterprises expand the production of import-substituting immunomodulatory and immunostimulatory medicines in various dosage forms and strengths.

### References:

1. З.А. Зупарова., Н.К. Олимов., А.М. Тўхтаева. Ўзбекистон республикасида руйхатдан ўтказилган иммуномодулятор ва иммуностимулятор дори воситаларининг ассортиментини ўрганиш//Ўзбекистон фармацевтик хабарномаси – Тошкент, 2019. – № 2. –С 7-10б.
2. Хайтов Р.М. Иммуномодуляторы: мифы и реальность//Иммунология, 2020, - №2. –С 101-106.
3. В. А. Исаков<sup>1</sup>, Д. В. Исаков<sup>2</sup> Иммуномодуляторы в терапии респираторных инфекций. Антибиотики и Химиотерапия, 2014, 59; 11—12
4. Тиббийёт амалиётида қўлланилишга рухсат этилган дори воситалари, тиббий буюмлар ва тиббий техника давлат реестри. – № 24. <https://www.uzpharm-control.uz/ru/pages/state-register-of-medicines-and-medical-products>.
5. Тиббийёт амалиётида қўлланилишга рухсат этилган дори воситалари, тиббий буюмлар ва тиббий техника давлат реестри. – № 25. <https://www.uzpharm-control.uz/ru/pages/state-register-of-medicines-and-medical-products>.
6. Тиббийёт амалиётида қўлланилишга рухсат этилган дори воситалари, тиббий буюмлар ва тиббий техника давлат реестри. – № 26. <https://www.uzpharm-control.uz/ru/pages/state-register-of-medicines-and-medical-products>.
7. Тиббийёт амалиётида қўлланилишга рухсат этилган дори воситалари, тиббий буюмлар ва тиббий техника давлат реестри. – № 27. <https://www.uzpharm-control.uz/ru/pages/state-register-of-medicines-and-medical-products>.