

INFLUENCE AND STUDY OF MEDICINAL PLANTS OF UZBEKISTAN ON THE IMMUNE SYSTEM

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Abstract

In medicine, there are many infectious diseases that the immune system begins to fight when they (the pathogen) enter the body. The effectiveness of the immune system's response largely depends on its condition (immune status). The importance of some medicinal plants is great for the stability of the immune system and the effective fight against foreign genes. Modern advances in medicine have made it possible to identify diseases that depend on the quantity and quality of cells of the immune system. In the treatment of such diseases of the immune system, positive results are obtained from the use of traditional medicine prepared from medicinal plants. The study examined the effect of medicinal plants on phagocytic neutrophil cells of the immune system.

Keywords: Infectious diseases, immune status, medicinal plant, phagocytosis, neutrophil.

Introduction

In recent years, researchers and practitioners – neonatologists, obstetricians-gynecologists, pediatricians, therapists – have been paying close attention to a set of problems related to the study of the ontogenesis of the immune system in the normal state and its functioning in pathological conditions in the perinatal period, early childhood, adolescence and aging

Studies in immunology show that the latest achievements of clinical disciplines that the pathogenesis of many diseases is related to the functioning of the human immune system.[1, 6,]. Various environmental factors and modern research methods lead to a serious disruption in the functioning of the immune system and a change in the immune status of the human body. [3, 8].



All these circumstances are due to the fact that the immune system is very vulnerable to damaging environmental factors and is the main target for research [3, 5]. Disruption of the functioning of various links of the immune system leads to an increase in autoimmune, allergic, non-infectious and infectious-inflammatory diseases, which are characterized by rapid progression, frequent relapses, and changes in the classic course of the disease. lack of clinical response to pharmacotherapy [2, 5].

In this regard, there is a growing interest in drugs that affect the immune system of the body and have a complex effect, taking into account the level and degree of damage to the immune system [1, 7]. Despite great success in the development of chemical drugs, there is still interest in herbal preparations and their active component with immunotropic activity, including for the treatment of chronic and long-term diseases [8].

According to the WHO (2019), about 130 countries in the world have official programs that use traditional medicine to treat diseases. The study of substances used in folk medicine of different ethnic or cultural groups (ethnopharmacology) makes a significant contribution to the discovery and development of modern methods of treatment [2, 8]. Some herbal medicines used around the world are well known for their anti-infective effects, not only by directly acting on the pathogen, but also by stimulating the host's natural defense mechanisms [3]. Recently, the use of herbal immunomodulators has been actively studied in the world, including for patients with COVID-19 [4, 6].

Objective:

To study the effect of herbal preparations on the phagocytic activity of blood neutrophils in laboratory animals, to study the effect of Turkestan Su immune tincture on immunogenesis and hematopoiesis in secondary immunodeficiency (irradiation, toxic hepatitis and hemolytic anemia).

Material and methods

At the first stage of the experiment, white mice were irradiated with a dose of 5.0 Gy using the RUM-17 X-ray machine. On the 7th day of the experiment, ram erythrocytes were injected into the abdominal cavity of mice as an antigen (immunization). On the day of immunization and on the 5th day, 0.15 ml of Turkestan Su immune tincture was injected into the abdominal cavity of mice. and 3 groups of mice were given **Turkestan Su immune tincture instead of water**.

Composition of Turkestan Su immunity tincture: ginger, olive leaf, papaya, noni, lavender, black currant, ginkgo biloba, guava leaves, white birch leaves and buds, rosemary, jerusalem artichoke, ground almonds, kelp, feijoa, khalila, balila, amyla. Milk thistle. On the 12th day of the experiment, antibody-producing and nucleus-containing cells, nucleus-containing thymus cells, erythrocytes and leukocytes were found in the blood of mice.

Results

At the first stage of the experiment, laboratory mice were divided into three groups: 1st group - healthy, 2nd group - irradiated, 3rd group - irradiated + immune tincture **Turkestan Su**.



Table 1

Experimental group (n=8)	Preparation	JACC x106	IP	Agro-industrial complex	IP	YASKT x106	IP
Healthy	-	378.6±3.6	-	7728.6±140.9	-	112.5±3.9	-
Irradiated	-	144.8±4.7a	-2.6	1933.3±24.5a	-4.0	44.8±2.5a	-2.5
Irradiated +	Turkestan Su	312.5±4.6b	+2.2	4216.7±54.3b	+2.0	108.3±4.2b	+2.4

Note: JAC – nucleated cells of the spleen, IS ratio index, APC – antibody-producing cells, JACT – nucleated thymus cells, index of α -irradiated animals compared to healthy animals. Accuracy of the indicators of the animals injected with β as compared to irradiated animals, the number of animals in the (n=8)-group.

Table 1 shows that the number of antibody-producing cells in the spleen of healthy animals was 7728.6±140.9. The number of antibody-forming cells in the spleen of irradiated mice really decreased by 4 times (1933.3±24.5), and when the irradiated animals were injected with an immune tincture **Turkestan Su** - actually increased by 2 times (4216.7±54.3). The number of nucleated cells in the thymus of healthy animals was 112.5±3.9. The number of nucleated cells in the thymus of irradiated animals actually decreased by 2.5 times, and in the 3rd group under the influence of immune tincture **Turkestan Su** it was equal to the indicator of animals of the healthy group. Thus, secondary immunodeficiency was caused in animals by exposure to light, and the cells of the immune system were restored with the help of an immune tincture **Turkestan Su**. When studying the hematological effect of immunity tincture **Turkestan Su** in animals exposed to light, it was found that the number of leukocytes in healthy mice was 7.1±0.1x10⁶/ml, but in fact it decreased by 2.5 times (2.8±0.2x10⁶/ml) under the influence of light (Table 2). It has been established that when introducing the tincture of immunity **Turkestan Su** the number of leukocytes increased by 3.2 times. It was established that the number of erythrocytes in the blood was restored as a result of the introduction of immunity tincture **Turkestan Su** irradiated animal.

Hematological parameters of irradiated animals

Table 2

Experimental groups (n=8)	Preparation	Erythrocytes x 10 ⁹ /ml	IP	Leukocytes x 10 ⁶ /ml	IP
Healthy	-	7.5±0.1		7.1±0.1	
Irradiated	-	6.7±0.2a	-1.1	2.8±0.2a	-2.5
Irradiated	Turkestan Su	8.2±0.1b	+1.2	8.0±0.2b	+3.2

Note: The IS index of the ratio, a is the reliability of the indicator of irradiated animals compared to healthy animals, b is the reliability of the indicators of treated animals compared to irradiated animals, (n=8) is the number of animals in the group.

According to the results of the experiment, it was established that as a result of light exposure in experimental animals, hematological parameters decreased and the tincture of immunity **Turkestan Su** coordinated these indicators. At the second stage of the experiment, to induce toxic hepatitis, mice were injected with 3.8 mg of heliotrin under the skin of each mouse for 3 days. On



the 5th day of the experiment, sheep erythrocytes were injected into the abdominal cavity of mice, as an antigen (immunization). On the day of immunization and on the 5th day, mice were injected with 0.15 ml of Turkestan Su immune tincture into the abdominal cavity, and mice of the 3rd group were given **Turkestan Su** immune tincture instead of water. nuclear nucleus-containing thymus, erythrocytes and leukocytes. For the experiment, the animals were divided into 4 groups: 1st group - healthy, 2nd group - toxic hepatitis, 3rd group - toxic hepatitis + immune tincture **Turkestan Su**, 4th group - toxic hepatitis + immune tincture **Turkestan Su**. Table 3 shows that the number of antibody-producing cells in the spleen of healthy animals was 7728.6 ± 140.9 . Number of antibody-producing cells in the spleen of mice with toxic hepatitis really decreased by 2.1 times (3700.0 ± 21.1), and when Turkestan Su immune tincture was administered to animals with toxic hepatitis, it actually increased by 2.1 times (7614.3 ± 50.8). The number of antibody-forming cells under the influence of immunomodulin on animals with toxic hepatitis actually increased by 1.8 times.

Immunological parameters of animals in toxic hepatitis

Table 3

Experimental groups (n=8)	Preparation	YAKS Spleens x106	IP	AOC	IP	YASKTx1 06	IP
Healthy	-	378.6 ± 3.6	-	7728.6 ± 140.9	-	112.5 ± 3.9	-
Toxic hepatitis	-	$117.2 \pm 4.0a$	-3.2	$3700.0 \pm 21.1A$	-2.1	$39.9 \pm 2.0A$	-2.8
Toxic hepatitis	Turkestan Su	$335.7 \pm 5.0b$	+2.9	$7614.3 \pm 50.8b$	+2.1	$133.9 \pm 5.3b$	+3.4
Toxic hepatitis	Immunomodulin	$233.9 \pm 5.3b$	+2.0	$6614.3 \pm 50.8b$	+1.8	$130.4 \pm 4.6b$	+3.3

Note: Spleen UCS - nucleated cells of the spleen, IS ratio index, AOC antibody-forming cells, JCT - nucleated thymus cells, index of animals with toxic hepatitis A to healthy animals. Relative reliability, reliability of indicators of animals treated with β -drug compared to animals with toxic hepatitis, number of animals in the group (n=8).

The number of nucleated cells in the thymus of healthy animals was 112.5 ± 3.9 . The number of nucleated cells in the thymus of animals with toxic hepatitis actually decreased by 2.8 times, and in 3-4 groups under the influence of **Turkestan Su** immune tincture and immunomodulin, it was equal to the indicator of animals of the healthy group.

It was established that the number of nucleated cells in the spleen of animals with toxic hepatitis was 378.6 ± 3.6 , decreased by 3.2 times under the influence of heliotrin and increased by 2.9 times under the influence of the immunotincture **Turkestan Su**. According to the results of the experiment, as a result of the effect of heliotrin on animals, along with changes in liver cells, changes in the organs and cells of the immune system were also observed, secondary immunodeficiency occurred, And under the influence of **Turkestan Su** immune tincture, the organs and cells of the immune system were restored.

In the study of the hematological effect of the Turkestan immune tincture of heliotrin, it was found that the number of leukocytes in healthy mice was $7.1 \pm 0.1 \times 10^6/\text{ml}$, while under the influence of heliotrin (Table 4). It was found that the immunity of **Turkestan Su tincture** increased by 2.3 times when administered to animals with toxic hepatitis and by 1.8 times under the influence of immunomodulin.



According to the results of the experiment, it was established that as a result of the effect of heliotrin on experimental animals, hematological indicators decreased, and the immune tincture **Turkestan Su** agreed on the number of leukocytes in the blood.

Hematological parameters of animals with toxic hepatitis

Table 4

Experimental groups (n=8)	Preparation	Erythrocytes x 10 ⁹ /ml	IP	Leukocytes x 10 ⁶ /ml	IP
Healthy	-	7.5±0.1		7.1±0.1	
Toxic hepatitis	-	6.2±0.1a	-1.2	3.5±0.1a	-2.0
Toxic hepatitis	Turkestan Su	6.1±0.1b		8.1±0.2b	+2.3
Toxic hepatitis	Immunomodulin	9.2±0.1b	+1.5	6.3±0.1b	+1.8

Note: The IS ratio index, the atoxic hepatitis index in animals is correct compared to healthy animals, the indicators of animals administered with the drug are correct compared to animals with toxic hepatitis, the number of animals in the group (n=8).

At the third stage of the experiment, 0.5 mg of phenylhydrazine was injected into the abdominal cavity of each mouse for 3 days in order to induce hemolytic anemia in laboratory mice. On the 5th day of the experiment, ram erythrocytes and mouse cavities were injected into the abdominal cavity as an antigen (immunization). On the day of immunization and on the 5th day, 0.15 ml of **Turkestan Su** immune tincture was injected into the abdominal cavity of mice. On the 10th day of the experiment, antibody-forming cells and nucleus-containing cells in the spleen of mice, nucleated thymus cells, erythrocytes, leukocytes and biochemical indicators in the blood were determined. To conduct the experiment, the animals were divided into 3 groups: 1st group - healthy, 2nd group - hemolytic anemia, 3rd group - hemolytic anemia + tincture of immunity **Turkestan Su**. Table 4 shows that the number of antibody-producing cells in the spleen of healthy animals was 7728.6±140.9. It was found that the number of antibody-producing cells in the spleen of mice with hemolytic anemia really decreased by 2.4 times, the number of nucleated thymic cells - by 2.7 times, the number of nucleated cells of the spleen - by 3.4 times. When **Turkestan Su** immune tincture was administered to mice with hemolytic anemia, it was found that the number of antibody-producing cells in the spleen actually decreased by 2.0 times, the number of nucleated cells in the thymus by 2.5 times, and the number of nucleated cells in the spleen by 3.2 times.

According to the results of the experiment, as a result of the effect of phenylhydrazine on animals, along with hemolytic changes, changes in the organs and cells of the immune system were also observed, secondary immunodeficiency occurred, restoration of organs and cells. Deterioration of the immune system under the influence of **Turkestan Su** tincture was not observed.

Immunological parameters of animals with hemolytic anemia

Table 5

Experimental groups (n=8)	Preparation	JACC x10 ⁶	IP	AOC	IP	YAKT x10 ⁶	IP
Healthy	-	378.6±3.6	-	7728.6±140.9	-	112.5±3.9	-
Hemolytic anemia	-	110.0±4.7a	-3.4	3280.0±37.4a	-2.4	41.3±2.5a	-2.7
Hemolytic anemia	Turkestan Su	347.9±6.0b	+3.2	6466.7±33.3b	+2.0	102.1±3.8b	+2.5



Note: JXS - nucleated cells of the spleen, IS ratio index, AOK - antibody-forming cells, JCT nucleated cells of the thymus. Cells, the indicator of a-hemolytic anemia in animals is correct compared to healthy animals, the indicators of animals that were injected with the b-drug are correct compared to animals with hemolytic anemia, the number of animals in the group (n=8).

In the study of the hematological effect of **Turkestan Su** immune tincture of phenylhydrazine in animals, it was found that the number of leukocytes in healthy mice was $7.1 \pm 0.1 \times 10^6/\text{ml}$, and the number of erythrocytes actually decreased by 2.4 times and by 2.8 times under the influence of phenylhydrazine (n=8)

Hematological parameters of animals in hemolytic anemia

Table 6

Experimental groups (n=8)	Preparation	Erythrocytes x 10 ⁹ /ml	IP	Leukocytes x 10 ⁶ /ml	IP
Healthy	-	7.5 ± 0.1		7.1 ± 0.1	
Hemolytic anemia	-	$2.7 \pm 0.1a$	-2.8	$2.9 \pm 0.1a$	-2.4
Hemolytic anemia	Turkestan Su	$7.3 \pm 0.1b$	+2.7	$6.4 \pm 0.1b$	+2.2

Note: the IS index of the ratio, the a-index of hemolytic anemia in animals is correct compared to healthy animals, the b-index of animals that have been injected with the drug is correct compared to animals with hemolytic anemia, (n=8) - the number of animals in the group. When **Turkestan Su immunotincture was administered** to animals with hemolytic anemia, it was found that the number of leukocytes in the blood increased by 2.2 times, and the number of erythrocytes - by 2.7 times.

Inference.

1. According to the results of the experiment, it was established that as a result of the effect of phenylhydrazine on experimental animals, hematological indicators decrease, and the immunity of **Turkestan Su tincture** affects erythropoiesis and leukopoiesis in the blood.

2. Finally, experimental animals were exposed to X-rays (radiation exposure), heliathrine (toxic hepatitis) and phenylhydrosine (hemolytic anemia) in order to develop secondary immune deficiency, and it was observed that the immune tincture **Turkestan Su** restored the cells of the immune system.

3. According to the results of the experiment, it was noted that exposure to X-rays (irradiation), heliathrin (toxic hepatitis) and phenylhydrosine (hemolytic anemia) causes secondary immunodeficiency deficiency, a decrease in hematopoietic elements and coordination of hematological indicators under the influence of **Turkestan Su** immune tincture .

4. It has been established that an increase in the total number of leukocytes and neutrophils can explain the increase in the phagocytic capacity of neutrophils. Thus, it can be concluded that herbal preparations have the ability to enhance one of the main factors of non-specific protection of the body - the phagocytic activity of neutrophils in the blood of mice.



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