Effect on Phagocytic Activity of Blood Neutrophils in Laboratory Animals by Herbal Preparations

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ABSTRACT

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. In medicine, there are many infectious diseases that the immune system begins to fight when they (the pathogen) enter the body. 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: Medicinal plants, infectious diseases, immune status, neutrophil, phagocytosis.

Relevance: The latest innovations and recent achievements in clinical disciplines and, in particular, immunology show that the pathogenesis of many diseases is more or less related to the functioning of the human immune system [1, 6,]. Modern research increasingly shows that Various environmental factors lead to an inevitable disruption of the functioning of the immune system and, as a result, a change in the immune status of the body [3, 8]. This is due to the fact that that the immune system is very vulnerable to damaging environmental factors and is a major target for research [3, 5]. Dysfunction of various parts of the immune system leads to an increase in autoimmune, allergic, non-communicable and infectious-inflammatory diseases, which are characterized by rapid progression, frequent relapses, and changes in the classical course of the disease. lack of clinical response to pharmacotherapy [2, 5].

At this time, drugs that affect the body's immune system and have a complex effect, taking into account the level and degree of damage to the immune system [1, 7]. Despite great successes 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].

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. According to the WHO (2019), about 130 countries around the world have official programs that use traditional medicine to treat diseases. [2, 8]. Some herbal remedies used around the world are well known for their anti-infective effects, not only by directly affecting the pathogen, but also by stimulating the host's natural defense mechanisms [3]. Recently, the use of herbal immunomodulators, including for patients with COVID-19, has been actively studied in the world [4, 6].

Objective: To study the phagocytic activity of blood neutrophils in laboratory animals and the effect of herbal preparations.

Material and methods: In experiments, the effect of a herbal preparation on the primary immune response in animals was studied. The femur of the mice was cleaned of muscles, the epiphyses were cut out, and the bone marrow was washed out of the bone canal in all organs of the cell suspension of the immune system, the number of granular cells (JASK) in the Goryaev chamber was counted and recalculated for the entire organ. This method was used to determine the total number of cells in the central (thymus, bone marrow) and peripheral (lymph nodes, spleen) organs of immunity. The experiments were carried out with the use of white mice weighing 20-22 g, which were immunized with the study drugs in the place with EB (detoxioma Ginger, Balsam Gulzor, Tea infusion Doctor Ali 1 1, Balsam Gulzor 17 - Doctor Ali 6 "Hepar Neo") at a dose of 0.25 ml/kg. used for experimental purposes (Strasbourg, 1986). Excel-2013 (Microsoft) applications were used for statistical processing and analysis of the obtained research results, as well as for plotting graphs based on the data obtained.

Results and discussion: Mice were given a single intravenous injection of the study drugs at the site of EB. After 4 days, the mice were slaughtered, blood was taken, then 50 µl of latex particles (diameter 1-1.5 µm) were added to 50 µl of blood, incubated for 30 minutes at +370 C, smears were made and phagocytosis indicators were determined. At the same time, the number of leukocytes was counted. 3 indicators of phagocytosis were determined:

1. Phagocytic index (PHI) – percentage of phagocytic leukocytes;
2. Phagocyte number (PF) is the average number of latex particles absorbed per leukocyte;
3. Phagocytic capacity (FEU) is the number of latex particles absorbed by leukocytes contained in 1 µL of blood.

Table 1.

Effect of Herbal Preparations on Phagocytic Activity of Blood Neutrophils in Mice (M±m)

Group *n=6*	Leukocyte count in 1µL x103	Kol-vo neytrophilov in 1mkl x103	FI, %	FC	FOE in 1µl h103
+EB Control	7.2±0.7	6.2±0.4	21.2±0.4	3.6±0.3	6.5±0.5
EB+DOC	7.8±0.4 IS=1.1	6.8±0.5 IS=1.1	22.0±0.5 IS=1.0	4.2±0.2 IS=1.2	7.0±0.6 IS=1.1
EB+Ginger	8.7±0.5A IS=1.2	7.8±0.3A IS=1.3	24.4±0.4A IS=1.2	4.9±0.2A IS=1.4	8.9±0.4A IS=1.4
EB+Detoxioma	9.5±0.6A IS=1.3	8.6±0.6A IS=1.4	26.6±0.6A IS=1.3	4.8±0.4A IS=1.3	9.5±0.5A IS=1.5
EB+Balsam Gulzor	11.4±0.8A IS=1.6	11.4±0.5A IS=1.8	31.5±0.5A IS=1.5	5.4±0.4A IS=1.5	9.7±0.4A IS=1.5
EB+Doctor Ali Tea Infusion 1	8.2±0.5 IS=1.1	6.7±0.4 IS=1.1	22.6±0.4 IS=1.1	4.0±0.2 IS=1.1	7.2±0.3 IS=1.1
EB+Balm Gulzor 17- Doctor Ali 6 "Hepar Neo"	12.8±0.7A IS=1.8	12.2±0.8A IS=2.0	42.6±0.6A IS=2.0	7.7±0.5A IS=2.1	13.5±0.7A IS=2.1

Note: IS-ratio index, [a] - reliability to the control, (n=6) – number of animals in the group

It was found that mice treated with detoxiome (purified complex) and Doctor Ali 1 tea infusion had an insignificant increase in phagocytic index, phagocyte number and phagocytic capacity (Table 1). Administration of ginger and detoxiome neutrophil counts, absorb latex particles, increased: ginger and detoxioma at a dose of 0.25 ml/kg they exceeded the control by 1.2 and 1.3 times, respectively. The average amount of

latex captured by a single neutrophil also increased: ginger and detoxioma were 40 and 50 percent higher than controls.

Injection of Balm Gulzor and Balm Gulzor 17-Doctor Ali 6 "Hepar Neo" the phagocytic index and phagocyte number significantly increase by 1.5 and 2.0 times, respectively.

Phagocytic capacity in 1 μl of blood changed more significantly: ginger, Gulzor balm and Gulzor 17 balm - Doctor Ali 6 "Hepar Neo" in 1.4; 1.5 and 2.1 times, respectively, exceeded the control.

Herbal preparations help to increase the number of leukocytes and neutrophils in the peripheral blood of mice. Thus, the number of leukocytes in the group of animals treated with Gulzor Balm and Gulzor 17-Doctor Ali 6 "Hepar Neo" increased by 60 and 80%, respectively, and neutrophils increased by 80 and 100%, respectively.

Conclusions: 1. Based on the results of the study, it can be said that an increase in the total number of leukocytes and neutrophils can explain the increase in the phagocytic capacity of neutrophils under the influence of drugs.

2. We have found 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.

3. The highest result was obtained with EB+Balsam Gulzor 17- Doctor Ali 6 "Hepar Neo" in comparison with the control one 2 or more times.

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 property of enhancing 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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