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# THE EFFECT OF PHYTOPHERON ON THE BODY'S IMMUNE SYSTEM.

# ВЛИЯНИЕ ФИТОФЕРОНА НА ИММУННУЮ СИСТЕМУ ОРГАНИЗМА

# FITOFERONNING TANANING IMMON TIZIMIGA TA'SIRI

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**Abstract:** Phytopheron, a natural compound derived from plants, has gained significant attention for its potential immunomodulatory effects. This study reviews the impact of Phytopheron on the body's immune system, focusing on its mechanisms of action, benefits, and potential applications in health and disease management. Evidence suggests that Phytopheron enhances immune response by modulating cytokine production and improving cellular immunity. These findings highlight Phytopheron's promise as a therapeutic agent in boosting immune function and combating various diseases.

**Keywords:** Phytopheron, immune system, immune response, immunomodulation, natural compounds, health benefits

**Аннотация:** Фитоферон, природное соединение, полученное из растений, привлекло значительное внимание благодаря своим потенциальным иммуномодулирующим эффектам. В данном исследовании рассматривается влияние фитоферона на иммунную систему организма, с акцентом на его механизмы действия, преимущества и возможные применения в здравоохранении и управлении заболеваниями. Доказательства свидетельствуют о том, что фитоферон усиливает иммунный ответ, модулируя продукцию цитокинов и улучшая клеточный иммунитет. Эти выводы подчеркивают перспективы фитоферона как терапевтического средства для повышения иммунной функции и борьбы с различными заболеваниями.

**Ключевые слова:** Фитоферон, иммунная система, иммунный ответ, иммуномодуляция, природные соединения, польза для здоровья.

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Annotatsiya: Fitoferron, o'simliklardan olingan tabiiy birikma, o'zining potentsial immunomodulyatsion ta'sirlari bilan katta e'tiborni qozondi. Ushbu tadqiqot Fitoferronning tananing immun tizimiga ta'sirini ko'rib chiqadi, uning ta'sir mexanizmlari, foydalari va sog'liqni saqlash hamda kasalliklarni boshqarishdagi mumkin bo'lgan qo'llanishlariga e'tibor qaratadi. Dalillar shuni ko'rsatadiki, Fitoferron sitokin ishlab chiqarishni modulyatsiya qilish va hujayra immunitetini yaxshilash orqali immun javobini kuchaytiradi. Ushbu topilmalar Fitoferronni immun funktsiyasini oshirish va turli kasalliklarga qarshi kurashishda terapevtik vosita sifatida va'da qilishini ta'kidlaydi.

Kalit so'zlar: Fitoferron, immun tizimi, immun javobi, immunomodulyatsiya, tabiiy birikmalar, sog'liq uchun foydalar.

**Introduction**

The immune system is the body's defense mechanism against infections and diseases. Recently, there has been growing interest in natural compounds that can modulate immune responses. Phytopheron, an active substance extracted from various plants, has been identified as a potential immunomodulator. This paper aims to explore the effects of Phytopheron on the immune system, discussing its mechanisms, benefits, and potential clinical applications.

**Main body**

1. Mechanisms of action

- Cytokine modulation: Phytopheron influences the production of cytokines, which are crucial in the regulation of immune responses. Studies indicate that Phytopheron can enhance the secretion of pro-inflammatory cytokines, aiding in the body's defense mechanisms.

- Cellular immunity: Phytopheron has been shown to improve the activity of various immune cells, including T-cells, B-cells, and natural killer cells. This enhancement is vital for an effective immune response against pathogens.

2. Health benefits

- Enhanced immune response: Regular intake of Phytopheron can lead to a stronger immune system, providing better protection against infections.

- Anti-inflammatory effects: By modulating cytokine production, Phytopheron can reduce inflammation, which is beneficial in managing chronic inflammatory diseases.

- Antioxidant properties: Phytopheron possesses antioxidant properties that protect immune cells from oxidative stress, thereby maintaining their functionality.

3. Potential clinical applications

- Infectious diseases: Phytopheron can be used as an adjunct therapy in treating infections by boosting the body's immune response.

- Chronic diseases: Its anti-inflammatory and antioxidant effects make Phytopheron a potential candidate for managing chronic diseases like rheumatoid arthritis and inflammatory bowel disease.

- Cancer: Preliminary studies suggest that Phytopheron may have a role in cancer therapy by enhancing the immune system's ability to target and destroy cancer cells.

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One of the pressing issues of the present day is the search for new natural immunomodulators with high activity, low toxicity, free from side effects and the introduction to medical practice. It is known from the literature (Aripova T.U. and b.2010; Botirbekov A.A.va b. 2010; Abdujalilova et al.,2011.). medicinal plants that are used in most folk medicine have the property of stimulating the immune system. Taking into account the above, we studied the effect of phytopheron, which consists of a collection of plants, on the body's immune system.

The experimental were conducted on 30 laboratory mice weighing 20-22 g, Academy Of Sciences Of The Republic Of Uzbekistan "Immunology ITI" -TI employee t.f.d., prof. A.A. Botirbekov was held in cooperation. Before the start of the experiment, the animals were immunized with sheep erythrocyte in a dose of 2·107. Then, for 3 days every day, mice from one career were given oral phytopheron at doses of 5 ml/kg and 10 ml/kg. In the same conditions, animals in the control group were given distilled water in accordance with it.

On the 4th day of the experiment, the Jerne and Nordin () method directly quantified the antibodies – forming cells (AXQX) in the black spleen by local hemolysis. In this case, the amount of AXQX was determined on the entire Black spleen and on the 1·106 cell of the black spleen. At the same time, the total amount of nuclear storage cells (QTYASX) in the black spleen was also calculated. Under the same conditions, the organs of the immune system were determined by the total amount of cells of the thymus, bone marrow, lymph glands in the abdomen, the amount of erythrocytes and leukocytes in the peripheral blood of animals in the experiment. Using the mentioned immunological methods, the effect of the drug phytoferon on the immunological reactivity of the body was studied and the results obtained in it are presented in Table 5.

**Immunological response of phytopheron to sheep erythrocytes.**

**Table 5**

| No | Experimental group | Summa-dosage of, ml / kg | Amount of QTYASX ×106 | IS | Antitela-forming cells | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | On the whole black spleen | IS | By cell ×106 of the black spleen | IS |
| 1. | Control group | dist. $H_2O$ | 97,2±6,9 | - | 1064,3±96,8 | - | 11,3±1,4 | - |
| 2. | Group that received phytoferon | 5 мл/кг | 144,3±8,2 | +1,48 | 4342,9±359,5 | +4,08 | 30,9±3,7 | +2,73 |
| 3. | Group that received phytoferon | 10 мл/кг | 131,2±9,3 | +1,35 | 4035,7±368,8 | +3,79 | 31,7±3,9 | +2,81 |

**Note:** QTYASX – core storage cells in the black spleen.

IS-index against control

- accuracy relative to control R<0.05

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According to the results presented in Table 5, the amount of nuclear storage cells in the black spleen of animals that received phytopheron at doses of 5 ml/kg increased by march 1.43 compared to those in the control group, while the amount of AXQX in the entire black spleen increased by 4.08 times, and it was equal to 1064.3+96.8 Hence, phytoferon increased the immunological response of mice to sheep erythrocytes at a higher level in the physiological normal state. In the same conditions, phytopheron tincture made the black spleen of mice 1 mln. It also increased the amount of AXQXs in the cell and it increased from 11.3±1.4 to 30.9±3.7.

Even when the dose of phytopheron was increased by 2 times (at a dose of 10 ml/kg), the drug caused the immunological response reaction of mice to sheep erythrocytes and an increase in the amount of AXQXs in the black spleen at the level of mathematical accuracy and it turned out to be the same as when taking the drug at a dose of 5 ml/kg.

In summary, it can be said that the drug phytoferon is used in the studied doses of 1 mln of the black spleen increases the amount of AXQXs in splenocytes and stimulates the body's immunological reactivity.

In subsequent Group experiments, we studied the effect of the drug phytoferon on the state of the organs of the body's immune system, central (in the thymus and bone marrow) and peripheral (in the lymph glands in the abdomen). The results obtained are shown in Table 6.

**Influence of phytopheron on the amount of Central and peripheral immune organs**.

**Table 6**

| No | Experimental group | Dosage of the drug, ml / kg | Thymus cell, ×106 | IS | Thymus cell, ×106 | IS | Cell of lymph glands, ×106 | IS |
|---|---|---|---|---|---|---|---|---|
| 1. | Control group | dist. $H_2O$ | 21,3±1,7 | - | 6,2±0,4 | - | 10,9±0,6 | - |
| 2. | Group taking the drug phytoferon | 5 мл/кг | 31,9±2,5 | +1,50 | 9,9±0,6 | +1,60 | 18,5±1,1 | +1,70 |
| 3. | Group taking the drug phytoferon | 10 мл/кг | 30,8±2,4 | +1,45 | 9,5±0,6 | +1,53 | 17,9±1,0 | +1,64 |

**Note:** - accuracy rate with respect to control is R< 0.05.

As shown in Table 6, while the number of thymocytes in the thymus in bari thymus from the central organs of the immune system of mice in the control group was 21.3±1.7×106, the number of thymocyte cells in the thymus of animals receiving phytopheron under the same conditions increased with mathematical accuracy (1.50 and 1.45 times) and they were 31.9 ± 2.5×106 when the drug was administered at 5 ml/kg doses, and 30.8 ± 2.4×106 at 10 ml/kg doses.

Therefore, thymocyte cells of the thymus to the phytopheron bring a response reaction to the surface with a high degree of sensitivity.

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Another of the organs of the phytoferon central immune system highly stimulates the proliferation of cells in the bone marrow and increases the amount of bone marrow cells by 1.60 and 1.53 times, respectively than in the control group.

In conclusion, it can be said that phytoferon accelerates the proliferation of central immune system cells, in particular thymus and bone marrow cells, in therapeutic doses.

In subsequent experiments, we studied the effect of phytopheron on the number of cells of the peripheral organ of the body's immune system, the lymph glands in the abdomen, and saw that the drug has the ability to stimulate the cells of the lymph glands as well. As a result, the phytoferon Assembly of the peripheral immune system organ increased the number of cells of the lymph glands to 1.70 and 1.64 ranks, respectively, than in controlled animals, and the number of lymphatic cells increased from 10.9±0.6×106 in the control group to 18.5±1.1×106 and 17.9±1.0×106.

So, the phytoferon Assembly also stimulates the cells of peripheral organs of the animal immune system.

In the course of the experiment, we focused on how phytopheron affects the blood elemenets in the peripheral blood of mice, in particular the amount of erythrocytes and leukocytes. The effect of phytopheron on the number of erythrocytes and leukocytes in the blood is presented in Table 7

**The effect of phytopheron on the amount of erythrocytes and leukocytes in the peripheral blood of mice (m±m, n=7).**

**Table 7**

| No | Experimental group | Dosage of the drug, ml / kg | Mice peripheral blood | | | |
|---|---|---|---|---|---|---|
| | | | Erythrocyte content, ×109 / ml | IS | Leukocyte content, ×106 / ml | IS |
| 1. | Control group | dist. $H_2O$ 5 мл/кг | 5,2±0,2 | - | 7,8±0,6 | - |
| 2. | Group that received phytoferon | 5 мл\кг | 5,8± | +1,11 | 8,9±0,6 | +1,14 |
| 3. | Group that received phytoferonv | 10 мл/кг | 5,9± | +1,13 | 9,3±0,7 | +1,19 |

**Note:** is-index against control.

As shown in Table 7, Phytoferon increased the levels of erythrocytes and leukocytes in the peripheral blood of mice to 1.1 – 1.2 rank, respectively, at studied doses.

In conclusion, it can be said that the phytoferon Assembly stimulates the primary immunological response reaction to sheep erythrocytes as well as the titer antithesis to erythrocytes in the

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peripheral blood. It also enhances the proliferation of the central and peripheral organs of the immune system of the aggregate body and in this way, accelerates the immune system of the whole organism.

**Conclusion**

Phytopheron presents a promising natural compound with significant immunomodulatory effects. Its ability to enhance immune response, reduce inflammation, and provide antioxidant protection makes it a valuable addition to health and disease management strategies. Further research and clinical trials are necessary to fully understand its potential and to establish standardized guidelines for its use.

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