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"EVALUATION OF IMMUNE PARAMETERS AND MODULATORY EFFECTS ON IMMUNE CELLS INDUCED BY NATURAL BIOACTIVE COMPOUNDS DERIVED FROM (*CHLORELLA VULGARIS)*"

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Introduction. Humans have long been exploring nature to discover new plant and animal species and to utilize them for economic purposes. Although the development of new plant varieties introduced the concept of "cultivated plants," an entire industry—technical microbiology—emerged, harnessing the activity of bacteria and microscopic fungi to isolate valuable compounds. Until relatively recently, the vast world of microscopic algae, particularly unicellular algae, remained largely unexplored within the scope of human practical activity. When microalgae finally became a focus of study and their potential as unique producers of essential compounds was recognized, ***Chlorella vulgaris*** emerged as the most suitable candidate for large-scale cultivation.The identification of antibody-producing cells in the spleen was carried out using the localized hemolysis method on agar, as described by Nordin and Jerne (1963). Toxic hepatitis was used to model secondary immunodeficiency. Rats with toxic hepatitis were administered a 20% solution of CCl_4 (0.2 ml) over three consecutive days and subsequently immunized with erythrocytes, which were injected intraperitoneally.

During the study, the number of nucleated cells in the spleen, the differences in immune cell populations between groups, the number of antibody-producing cells (APCs), and the mean number of hematopoietic cells were determined. The reliability of the results and the error margin were set at 95%. Blood cells, including erythrocytes

and leukocytes, were counted using conventional methods, and microscopic analysis was performed with a Goryaev chamber.

Discussion of Experimental Results. The activity of natural biologically active medicinal compounds derived from *Chlorella vulgaris* plays a significant role in restoring the immune system. Therefore, the effects of ***Chlorella***-based preparations on the immune system were studied experimentally. In the experiment, in addition to evaluating the effects of compounds obtained from ***Chlorella***, a thymalin preparation containing naturally isolated thymus peptide was also used. This immunostimulant was applied as a control drug for comparison.

The results obtained were as follows. The effects of ***Chlorella***-based preparations on erythropoiesis and leukopoiesis were also studied. In healthy animals of the control group, the number of leukocytes was +5.8 thousand, whereas in animals with immune deficiency induced by CCl_4, this number was 3.4 thousand. In the group administered thymalin, the leukocyte count reached +4.1 thousand. In the group administered the ***Chlorella*** compound, the leukocyte count was +4.7 thousand, indicating a 1.4-fold restoration. The treatment had almost no effect on the number of erythrocytes.

No significant changes in the external appearance of the animals were observed during the experimental observations. Animals with induced immune deficiency showed poor appetite and some changes in the skin.

When observing animals treated with the natural biologically active medicinal compound derived from *Chlorella vulgaris*, animals with each immune deficiency (I/T) condition were treated for five days with various doses of the compound. Changes in the number of antibody-producing cells in the spleen and the magnitude of the effect were determined. According to the experimental results, the number of antibody-producing cells (APC) in intact healthy control animals was 7378 ± 503. In the control group with secondary immune deficiency induced by tetrachlorocarbon (CCl_4), the number of APCs was 1032 ± 203, representing a 6.1-fold decrease compared to the control group, indicating a severe condition of immune deficiency ($p < 0.05$).

The thymalin immunostimulator increased the number of antibody-producing cells (APC) to 5241 ± 637, representing a 5.0-fold increase. The natural biologically active medicinal compound from *Chlorella vulgaris* increased the number of APCs to 6150 ± 687, a 4.5-fold increase, and in a 1% solution, the number of antibody-producing cells rose to 8052 ± 673, representing a 6.1-fold increase ($p < 0.05$).

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