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# **INTEGRATION OF SCIENTIFIC BASES INTO PRACTICE**

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## INTEGRATION OF SCIENTIFIC BASES INTO PRACTICE

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# **INFLUENCE OF HUMES BASED ON HUMINIC ACIDS UNDER SITUATIONAL STRESS ON SOME INDICATORS OF RAT BLOOD LEUCOCYTIC FORMULA**

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Nowadays, both humans and animals are increasingly faced with all sorts of stressful situations. The development of stress underlies many pathological processes, so the study of the effects of extreme factors on the body is necessary for a deeper understanding of the causes and prevention of diseases [11].

During life in the body there are numerous adaptive reactions in response to changes in living conditions. Some of these reactions can be characterized as stress [2, 3].

It is known that the dynamics of the biochemical composition of blood can characterize the strength and duration of the stressor or the duration of adaptation of the organism to its effects [4]. Along with this, a valuable source of information about the state of the body is a leukogram [5]. The analysis of white blood made according to the leukogram is a set of quantitative and qualitative indicators of peripheral blood, which allows to detect both the presence of deviations from normal values and to substantiate assumptions about possible mechanisms of their development. The study of leukogram is of great diagnostic and prognostic value, so changes in the total number and ratio of different types of leukocytes, as well as their morphology are determined not only by individual reactivity and functional status, but also by the nature, course, location and spread of the pathological process [6].

Finding tools that help normalize the morphology and function of blood cells is an urgent task. To solve it, special food supplements of natural origin with a wide range of therapeutic and prophylactic effects are offered [7].

The aim of our study was to determine the effect of situational stress on the leukocyte composition of the blood of rats, the mass of the thymus and spleen when using biologically active substances.

In this regard, we were assigned the following tasks:

1. To determine the leukocyte formula of blood and the mass of organs - thymus and spleen of intact rats.

2. To identify the effect of situational stress on the leukocyte formula of peripheral blood and the mass of the organs of rats on the background of the use of sodium humate.

3. Develop a dosage form of a new drug.

Material and research methods:

The experiments were performed on male rats aged 6-7 months, weighing 220-270 g. The animals were divided into four groups of five animals in each group. Group 1 - control (intact animals), not subject to exposure. Group 2 - rats that received daily humate. Group 3 - rats that were subject to emotional stress. Group 5 - rats subjected to stress on the background of taking humate. Animals of groups 2 and 4 were daily injected intramuscularly with huminate at a dose of 15 mg/kg rat weight (huminate was made from environmentally friendly peat in the form of 1% aqueous solution). The composition of the humate was: sodium salt of humic acids, amino acids (including essential), trace elements (iron, aluminum, silicon, manganese, titanium, copper, nickel). For one month, we created a model of chronic situational stress (CSS) in experimental rats by constant disturbances in the mode of feeding, drinking (and their deprivation), lighting, keeping in overcrowded cages with irregular changes in their composition in a random sequence.

The leukogram was calculated according to the generally accepted method. To do this, blood was taken from animals, smears were prepared, and they were stained [8].

Statistical processing of research results was performed using the program "Statistica" (using Student's t-test).  $P < 0.05$ .

Research results and discussion:

In rats treated with sodium humate for a month, there were slight changes in the leukogram. On day 14, we found an increase in rod-shaped neutrophils by 30% to  $3.40 \pm 0.50$  compared with baseline. The number of segmental and lymphocytes did not change and was within normal limits.

On day 28, it was recorded that the dynamics of the number of segmental and rod-shaped neutrophils was within the physiological norm. This, in our opinion, may be due to the fact that the animals received humate, which is very rich in various biologically active substances, so the dynamics of the leukogram of the blood of rats was within normal limits and did not show significant changes.

In rats exposed to emotional stress in the leukogram, we observed the following changes: on day 14 there was an increase of 41% in rod neutrophils and an increase of 14% in segmental neutrophils compared to baseline.

An increase of 6% of segmental neutrophils to  $64.60 \pm 0.92$  and a decrease of 26% of lymphocytes to  $19.00 \pm 0.44$  compared to baseline were observed. Thus, the state of stress has a significant effect on the cellular composition of the peripheral blood of experimental animals and the phagocytic capacity of leukocyte cells.

In rats exposed to stress and receiving sodium humate for 14 days, there was a slight decrease in rod neutrophils by 7% to  $2.80 \pm 0.48$  and a decrease in segmental neutrophils by 7% compared to baseline. The number of lymphocytes on the 14<sup>th</sup> day

increased by 15% and. The dynamics of the number of monocytes and eosinophils within the normal range. On day 28, there was a decrease in rod nuclear neutrophils by 20%, and a decrease in the number of segmental neutrophils by 23% compared to baseline.

In our experiment, the increase in the percentage of neutrophils in the leukogram of the peripheral blood of rats was less pronounced in stressed animals. Our results are consistent with the data of the authors [9-10].

Thus, the change in the blood system under chronic stress, due to the urgent mobilization of all components of the blood system to implement the body's adaptive response to stress and especially to activate the immune system.

Based on the obtained experimental data, we have developed a dosage form - a solution for oral administration.

#### Conclusions:

1. It is shown that the rats of the control group showed the arrival of young rod cells, but the indicators of the leukogram remained within the physiological norm.
2. It was found that under conditions of emotional stress on the 28<sup>th</sup> day of the experiment there was an increase in the number of segmental neutrophils by 17%, eosinophils by 22% and a decrease in the number of lymphocytes by 26%.
3. We have developed a dosage form - a solution for oral administration.

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