

THE INFLUENCE OF SHORT LASTING STARVATION UPON THE
LEUCOCYTES OF RABBITS.

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The blood system is a sensitive indicator of changes which takes place during the stress reaction. It refers to short and long lasting influences of the environment with the change of the standard values. The response on the stress influence are genetically conditioned, they are influenced by the constitution which determines the efficiency of farm animals in the complex.

The mentioned dependences in rabbits are presented by the authors Szubatowska and Gromysz-Kalkowska (1987) who observed the leucocytes in dependence on the breed. The high percentage of lymphocytes and the low leucocyte index points out the highest resistance of the Great Belgian against the stressor from all observed breeds.

Information about the basic haematological indicators of the rabbits is available in some publications (Fex, 1972; Kourád, 1972; Laird, 1970; Weisbreth, 1974; Hintsa, 1982;

Szubatewska, 1987).

The influence of chemical preparations as stressors in differentiated rabbit breeds are the subject of the study of the genetical and physiological basis of the adaptation mechanism. On the basis of the stressoric reactions of the rabbits three regulative types (Krzysztofowiczowa, 1981; Tokarski, 1977) were created. These are considered as genetically determined. From the observed characteristics of the blood count of the New Zealand White rabbits was under the influence of the desanquimating stress (Parkányi et al., 1985) observed the increase of the neutrophils level and simultaneously the decrease of the lymphocytes number as the expression of the stress reaction.

On the basis of the computation of the individual lymphopenic indices the authors Rafay and Parkányi (1987) state that the reaction of the observed New Zealand White rabbits represents the facilitary and plastic type of lymphopenic response.

Material and Method

We have used 18 males of the Nitra breed (Ni) to observe the sensitivity of rabbits to the short lasting starvation stress. Into the experiment clinically healthy animals with the average live weight of 3 308 g, were chosen. During the experimental period they were individually housed in metal breeding cages with the dimensions of 75 x 75 x 42 cm. During four days they had only water from automatic drinkers at disposal. Every day we have evaluated the

live weight as well as the take - off of blood samples from the ear vein, always between 8.00 - 10.00 hours. Haematological examination was made according to pauley et al. (1973). We have observed the number of leucocytes per mm^3 and in the blood smear we have meanderingly on more places of the preparation evaluated 100 leucocytes from every animal and at the same time we have differentiated eosinophiles, neutrophiles, basophiles, monocytes, and lymphocytes.

The gained values were statistically processed according to Kruskal-Wallis test. The Kruskal-Wallis test is a nonparametric analysis of variance which may be used to compare several independent samples. The present program is written as an elementary subset of BASIC and will perform Kruskal-Wallis test followed by multiple comparisons between the groups on practically any computer programmable in BASIC.

Results and discussions

Starvation can also be taken as a great stress upon the rabbit organism. In our observation we have used the starvation stress as the sensibility test of the genotyp of the Nitra rabbit (N1), which is expressed in the observed live weight and in leucocytes.

In the table No. 1 there is the live weight in grammes during the four observed days. The live weight decrease from 3308 ± 116.03 g, over 3179 ± 140.35 g ($t_{0.05}$) to 3131 ± 137.55 g ($t_{0.01}$) is high significant. Testing with

the help of Kruskal-Wallis test has confirmed that the starvation stress during the four days causes highly significant decrease of live weight of Ni males. The live weight decrease confirmed the starvation effectiveness upon the rabbit organism but however, it signals very little about the sensibility, or about the resistance of Ni rabbits against the evoked stress.

By means of regulation mechanisms certain characteristic changes in leucocytes and in proliferation of the strain cells of the haemopoetic tissue take place. Table No. 2. shows the level of leucocytes per 1 mm^3 of the peripheral blood. From the results the tendency to leucopeny is obvious. However, a significant change of Leu/mm^3 during the starvation (7690, 6740, 7460 and 5520) was not observed. Similarly in lymphocytes (table No. 3) the difference during the observed period (75.40, 72.30, 75.30) is not significant. Taking the data of the authors Szubartowska and Gromysz-Kalkowaka (1987) and the achieved results the high percentage of lymphocytes and the non-significant leucopeny with the Ni breed refer to a certain degree of resistance of the observed animals towards the evoked short lasting stress.

Netoušek (1951) mentions the biological curve of the blood count in the period of the defence reaction has a typical course in the relation to the leucocytes. In this period the increase of neutrophil leucocytes and the decrease or the extinction of the eosinophil leucocytes is found out.

In our experimental too, we have noted a significant neutrophiles raise (table No. 3) from 8.00 ± 8.98 up

to 24.00 ± 10.53 with the simultaneous decrease of eosinophils from 14.70 ± 9.33 to 0.60 ± 0.84 .

According to the results of the influence of the short lasting starvation upon the leucocytes and live weight of the Nitra breed rabbits - Ni we can state, that the average loss on live weight during the four days was 117 g, thereby the adaptability degree of the rabbits is expressed with a high percentage of lymphocytes and non-significant leucopeny during the whole followed period.

A typical defence reaction is a significant raise of neutrophils and the decrease of eosinophils.

Summary

The sensibility of Nitra breed rabbits (Ni) against the short lasting starvation stress was observed. The live weight, leucocytes/mm³, lymphocytes, neutrophils, and eosinophils of 10 males were evaluated during four days. The gained values were processed with the Kruskal-Wallis test. The decrease of live weight from 3308 ± 116.03 g to 3131 ± 137.55 g is highly significant. The adaptability degree of the Ni breed is expressed with a high percentage of lymphocytes with a non-significant leucopeny during the whole observed period. A typical defence reaction is a significant raise of neutrophils and decrease of eosinophils.

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Table No. 1

Live weight in grammes

/n = 10/

Characteristics	Days of starvation			
	1.	2.	3.	4.
\bar{x}	3308	3241	3179	3131
s	116,03	120,41	140,35	137,55
v %	3,51	3,72	4,42	4,39
t - test	1:3 ⁺ , 1:4 ⁺⁺	2:4 ⁺	3:1 ⁺	4:1 ⁺⁺ 4:2 ⁺

Table No. 2

Leucocytes/mm³

/n = 10/

Characteristics	Days of starvation			
	1.	2.	3.	4.
\bar{x}	7690	6740	7460	5520
s	1601,70	2495,42	2757,29	1624,67
v %	20,83	37,02	36,96	29,43
t - test	NS	NS	NS	NS

Table No. 3

Blood diferential (%)

(n = 10)

Characteristics	Days of starvation				
	1.	2.	3.	4.	
Lymfocyty	\bar{x}	75,40	72,30	75,30	75,30
	s	7,78	15,49	19,99	10,23
	v%	10,31	21,43	26,55	13,59
	t	NS	NS	NS	NS
Neutrofilly	\bar{x}	8,00	22,90	23,90	24,00
	s	8,98	15,83	20,17	10,53
	v%	112,27	69,12	84,39	43,88
	t	1:2 ⁺ ,3 ⁺ ,4 ⁺⁺	2:1 ⁺	3:1 ⁺	4:1 ⁺⁺
Eozinofily	\bar{x}	14,70	2,60	0,50	0,60
	s	9,33	3,06	0,71	0,84
	v%	63,49	117,78	141,42	140,55
	t	1:2,3,4 ⁺⁺⁺	2:1 ⁺⁺⁺ 2:3 ⁺	3:1 ⁺⁺⁺ 3:2 ⁺	4:1 ⁺⁺⁺

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