

## CHANGES IN THE ELECTROPHORETIC SPECTRE OF BLOOD SERUM PROTEINS OF RABBITS IN THE COURSE OF TRICHINELLOSIS

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Comparatively few publications have been hitherto devoted to the problem of changes in the electrophoretic pattern of serum protein fractions of the host in the course of trichinosis.

Serum protein studies according to Tiselius in trichinellosis of rabbits were published by Wright and Oliver-Gonzalez (1943) and in trichinellosis of humans (epidemic in the region of Düren) by Schwonzen (1951). Using microelectrophoresis method, Seniów (1954, 1955) has studied the changes in serum protein fractions in trichinellosis of guinea pigs.

## Material and methods

The experiments were made on 10 adult rabbits (White Polish albino) of both sexes. All animals were maintained under the same conditions before and during the experimental period. The rabbits were infested by the administration of rabbit meat containing great amounts of encysted *Trichinella* larvae; the infestation, brought about in this way, was of intense degree. After the completion of experiments the muscles of the mandible and diaphragmatic pillars were found to contain within trichinoscopic field on average about 8-10 and occasionally even 12-15 *Trichinella* larvae.

The blood was taken on empty stomach by the: 7th, 14th, 26th, 40th, 51st 75th 136th and 167th day of invasion.

The serum was fractionated by microelectrophoresis method. On strips of Macherey-Nagel paper No. 214 (36×4 cm.) soaked in veronal buffer (pH 8.6,  $\mu$ 0.10), was dropped 0.01 ml. of fresh serum; the separation time 12 hours at the temperature of 20°C, tension of the current 170 V, and density 0.3 mA/cm. of strip. The electrophorograms were stained with diluted bromphenol blue according to Durrum. The separation of fractions (albumin,  $\alpha_1$ ,  $\alpha_2$ ,  $\beta$  and  $\gamma$  — globulins) was obtained on a length of about 8-8.5 cm. Quantitative determinations were performed by elution method.

## Discussion of results

A pronounced decrease could be observed in the albumin fraction as compared with the pre-invasion measurements.

The mean values of all	before invasion: 61.92 per cent
measurements	during invasion: 45.91 per cent

The reduction in the albumin level is to be seen immediately at the beginning of invasion, whereas its variations during the invasion are but slight. The lowest albumin values were observed by the 51st and 75th day of invasion.

Table 1

Mean values of all series of the measurements of serum of healthy and infested rabbits

Rabbits	Albumins	$\alpha$ -globulins	$\beta$ -globulins	$\gamma$ -globulins
Healthy	61.92	13.03	11.32	13.55
Infested	45.91	20.29	9.98	23.82

Globulin fractions exhibited a clear-cut increase in  $\alpha$ -globulins ( $\alpha_1$  and  $\alpha_2$ ):

The mean values of all measurements before invasion: 13.03 per cent  
during invasion: 20.29 per cent

It is noteworthy that the  $\alpha$ -globulin curve shows two peaks; the first one could be seen by the 7th day of invasion, by the 14th day of invasion  $\alpha$ -globulin values were consistent with the percentage of this fraction in healthy animals, and in the fourth weeks of invasion, a repeated  $\alpha$ -globulin increase could be found which persisted on this level until the end of the observation period.

Table 2

Electrophoretic fractions of serum proteins in the course of trichinellosis  
(mean values in per cent)

Time	Albumins	Globulins		
		$\alpha$	$\beta$	$\gamma$
Before invasion	61.92	13.03	11.32	13.55
7 day after invasion	47.75	21.28	9.25	21.72
14 day after invasion	49.96	11.54	14.39	24.11
26 day after invasion	49.54	19.13	8.20	23.33
40 day after invasion	45.20	21.45	9.66	23.69
51 day after invasion	42.67	22.57	9.69	24.79
75 day after invasion	42.42	22.35	9.52	25.61
136 day after invasion	45.60	21.96	8.97	23.57
167 day after invasion	44.14	22.05	10.13	23.70

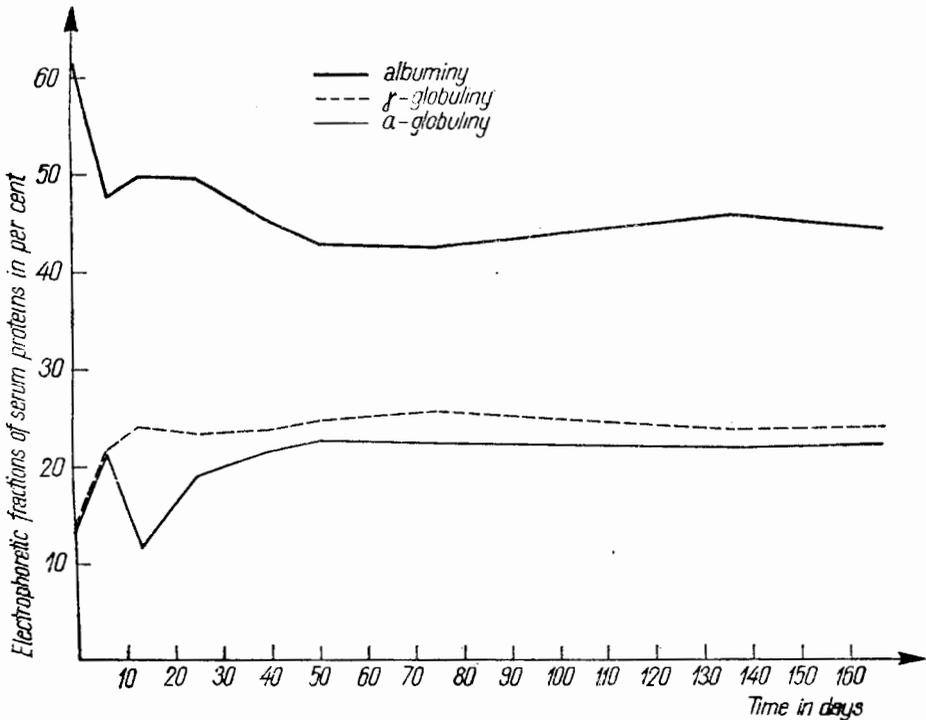
The slightest variations were found within  $\beta$ -globulin fractions. A pronounced increase could be observed by the end of the second week of invasion; on the other hand, a slight reduction in  $\beta$ -globulin level was seen both at the very beginning of invasion (7th day) and in its further course, as compared with normal rabbits.

A pronounced increase in  $\gamma$ -globulin fractions was visible in the whole course of invasion:

The mean values of all measurements before invasion: 13.55 per cent  
 during invasion: 23.82 per cent

The behaviour of  $\gamma$ -globulin fractions is characterized by two facts: a sudden spring-like increase in the first week of invasion followed by the gradual elevation up to 25.61 per cent by the 75th day of invasion.

The  $\gamma$ -globulin curve is to a certain degree a mirror reflection of albumin curve (diagram 1).



Curves of albumins,  $\alpha$ -globulins ( $\alpha_1 + \alpha_2$ ), and  $\gamma$ -globulins in trichinellosis

The Student  $t$  test showed statistically significant differences in mean values of protein fractions. The highest value was found for  $\gamma$ -globulins, lower for  $\alpha$ -globulins and the lowest one for  $\beta$ -globulins fraction. The above data are given in table 3:

Table 3

The comparison of mean values by Student  $t$  test

Degree of freedom = 122; $t_{0.05} = 1.98$	
Healthy	infested
Albumins	$t = 18.3$
$\alpha$ -globulins	$t = 11.0$
$\beta$ -globulins	$t = 2.9$
$\gamma$ -globulins	$t = 19.9$

### Conclusions

Changes in the protein spectre in the course of trichinellosis of rabbits may be roughly characterized as those so consistent with subacute inflammation according to Wuhrmann and Wunderly (increase in  $\alpha$ -and  $\gamma$ -globulins). The increase in  $\gamma$ -globulin percentage in the first week of invasion may be attributed to an early formation of antibodies.