

CONTENT OF CATECHOLAMINES IN THE ORGANS  
AND TISSUES OF ALBINO RATS DURING BLOOD  
TRANSFUSION REACTIONS

R. M. Glants and A. N. Yakovenko

UDC 616-056.13-02:615.38-07:

616-008.944.52-07

Transfusion of heterogenic blood into rats causes a decrease in the adrenalin content in the adrenals and an increase in the noradrenalin content in the brain, heart, skeletal muscles, and kidneys. Administration of benzhexonium blocks this reaction.

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Previous experimental and clinical investigations have shown that transfusion reactions are accompanied by changes in the state of function of all components of the reflex arc and the cortex of the adrenals, the anterior and posterior lobes of the pituitary, and the incretory part of the pancreas [1, 2].

To develop these investigations we have studied the role of the sympathico-adrenal system in the pathogenesis of transfusion reactions.

EXPERIMENTAL METHOD AND RESULTS

Transfusion of heterogenic blood was chosen as the model of transfusion reactions: dog's blood was injected into rats in a dose of 5 mg/kg body weight. Six series of experiments were carried out on 158 noninbred male albino rats weighing 100-220 g (72 control and 86 experimental animals). The rats were killed by decapitation; control animals selected by weight were sacrificed at the same time as the experimental rats. Catecholamines were determined by Osinskaya's method of fluorescence analysis [3], enabling differentiation between noradrenalin, adrenalin, and oxidation products of catecholamines.

The results given in Table 1 show that heterotransfusion was accompanied by a decrease in the adrenalin concentration in the adrenals and an increase in its concentration in the brain, heart, skeletal muscle, and kidneys, lasting for 60 min. The noradrenalin concentration in the adrenals showed no essential change. These results indicate that during transfusion reactions changes occur in the function of both the hormonal and mediator components of the sympathico-adrenal system.

To study the mechanism of the changes in concentration of the adrenergic mediator in heterotransfusions, the concentration of catecholamines was investigated after preliminary injection of a ganglion-blocking agent. Benzhexonium (10 mg/kg body weight) was injected intravenously 5 min before heterotransfusion, and 30 min later the animal was sacrificed. The results of these investigations showed that after blocking of the autonomic ganglia, heterotransfusions were no longer accompanied by an increase in the noradrenalin concentration in the heart, kidneys, and striated muscle (Table 2).

These experiments show that the state of the sympathico-adrenal system plays an important role in changes in the state of function of the nervous system after heterogenic transfusions.

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Experimental Division, L'vov Research Institute of Hematology and Blood Transfusion (Presented by Academician of the AMN SSSR N. A. Fedorov). Translated from *Byulleten' Éksperimental'noi Biologii i Meditsiny*, Vol. 67, No. 4, pp. 15-17, April, 1969. Original article submitted April 15, 1968.



TABLE 2. Content of Noradrenalin in the Heart (in  $\mu\text{g } \%$ )  
After Heterotransfusion Against a Background of Benzo-  
hexonium Administration

Serial no.	Groups of animals	<i>n</i>	$M \pm m$	$P_1$	$P_2$	$P_3$
1	Intact	10	$100,3 \pm 9,1$	<0,05		
2	Heterotransfusions	11	$154,3 \pm 12,2$			
3	Benzo-hexonium + heterotransfusion	10	$107,7 \pm 12,3$		>0,05	<0,05

Note:  $P_1$  denotes significance of difference between groups  
1 and 2;  $P_2$  significance of difference between groups 1 and 3;  
 $P_3$  significance of difference between groups 2 and 3.

#### LITERATURE CITED

1. R. M. Glants, Vrach. Delo, No. 9, 921 (1956).
2. R. M. Glants, Probl. Gematol., No. 3, 24 (1966).
3. V. O. Osinskaya, Biokhimiya, No. 3, 537 (1957).