

THE RETICULOENDOTHELIAL SYSTEM AND BLOOD SERUM CHOLINESTERASE

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A number of experimental observations indicate that blood serum cholinesterase is formed in the liver [4, 6, 9]. Most researchers believe that the site of synthesis of this enzyme and the source of its penetration into the blood is precisely the hepatic parenchyma. However, some studies cite evidence that blood serum cholinesterase is formed in the cells of the reticuloendothelial system [3, 5].

We conducted experiments on the administration of colloids to animals and on removal of the spleen, to clarify the role of the reticuloendothelial system in the formation of blood serum cholinesterase.

EXPERIMENTAL PROCEDURE

The cholinesterase activity was determined by T. V. Pravdich-Neminskaya's method [2]. The enzyme activity was expressed in percent of cleaved acetylcholine, calculated on the basis of the total amount of it used in the experiment.

The spleens of two dogs and two rabbits were removed. The operation on the dogs was performed under ether-chloroform narcosis, while that on the rabbits was performed under ether. Morphine was injected subcutaneously (0.005 g/kg), half an hour before the operation on the dogs.

The experiments were conducted at first on three dogs, weighing 10-12 kg.

They received 10 ml of a 10% colloidal iron solution (ferrioxidyati saccharati) or 10 ml of a 1% Trypan Blue solution injected into the subcutaneous vein of the femur. The cholinesterase activity was investigated in blood serum taken from the same vein or from the femoral artery, before the injection of the colloid and at various periods after injection.

TABLE 1. Blood Serum Cholinesterase Activity in Dogs After Injection of Colloid

Dog No.	Injection of colloid	Initial cholinesterase activity after injection	Activity of cholinesterase after injection				Investigated blood
			after 1 h	after 1 day	after 2 days	after 5 days	
1	10 ml of 10% colloidal iron	65,7		74,4	64,0	66,0	} Venous
2	10 ml of 1% trypan blue .	43,3	47,7		43,1	45,6	
3	10 ml of 1% trypan blue .	43,8	39,7				Arterial

TABLE 2. Blood Serum Cholinesterase Activity in Rabbits Before and After Single and Repeated Injections of Colloidal Iron

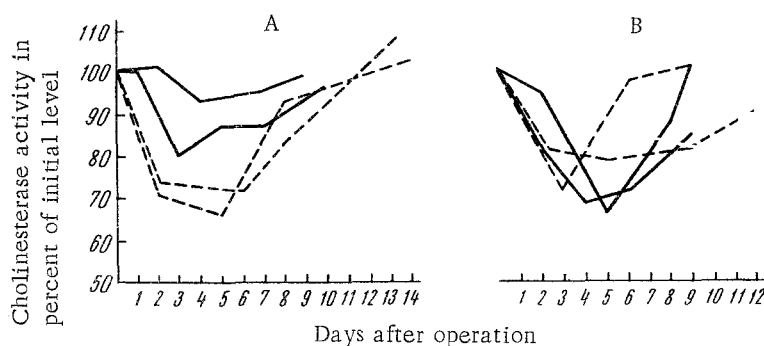
Rabbit No.	Cholinesterase activity	
	before injection	after injection
Single injection		
1	13,6	11,8
2	16,2	12,9
3	11,0	10,5
4	23,7	21,3
5	12,7	14,1
$M \pm m$ P	$15,4 \pm 3,1$	$14,1 \pm 1,9$ $>0,1$
Repeated injections		
	No. of injections	
1	9	18,2
2	9	17,2
3	25	13,2
4	36	13,6
$M \pm m$ P		$16,7 \pm 1,1$ $>0,5$

The cholinesterase activity in the blood serum of five rabbits was determined before and three to four hours after the injection of 5 ml of a solution of colloidal iron into the ear vein; in experiments on four other rabbits, the blood serum cholinesterase activity was determined before and after repeated injections of 2 ml of a solution of colloidal iron per day.

EXPERIMENTAL RESULTS

No significant regular changes in the level of enzyme activity were noted in any of the experiments (Tables 1 and 2).

In experiments on the removal of the spleen, we observed a small decrease in the blood serum cholinesterase activity on the second to third day after the operations, with a return after several days to a level close to the initial level. In order to determine whether this decrease is related to the removal of the spleen or to a nonspecific influence of operation trauma, laparotomy, but without removal of the spleen, was performed on two dogs and two rabbits. A piece of the omentum was removed from each of the dogs. It was found that laparotomy itself gives rise to a



Variations of the blood serum cholinesterase activity (in percent of initial level). A) After removal of spleen; B) after laparotomy without removal of spleen. Solid line—experiments on dogs; dotted line—on rabbits.

similar decrease in the cholinesterase activity (see figure). This coincides with the indications of a number of authors of a decrease in the blood serum cholinesterase activity after surgical operations [7, 8, 10].

In the light of the existing data on neurogenic mechanisms of the regulation of enzymatic hydrolysis of acetylcholine [1], it may be assumed that the changes in the cholinesterase activity in the blood, which occur after surgical trauma, depend on reflex influences on the processes of metabolism, including the processes of synthesis and penetration of this enzyme into the blood. The possibility also remains that postoperative lowering of the cholinesterase activity may depend on the appearance in the blood of substances that inhibit the activity of this enzyme. Thus, the results of experiments on the administration of colloids to the animals and the removal of their spleens do not confirm the hypothesis of a relationship of the blood cholinesterase activity to the function of the reticuloendothelial system.

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All abbreviations of periodicals in the above bibliography are letter-by-letter transliterations of the abbreviations as given in the original Russian journal. *Some or all of this periodical literature may well be available in English translation.* A complete list of the cover-to-cover English translations appears at the back of this issue.
