

INFLUENCE OF VITAMIN C ON THE OSMOTIC RESISTANCE OF GUINEA PIG ERYTHROCYTES

(UDC 615.857.064.2-092:612.118.3+612.118.3-06:615.857.064.2)

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Translated from *Byulleten' Éksperimental'noi Biologii i Meditsiny*, Vol. 58, No. 11,
pp. 56-58, November, 1964
Original article submitted October 7, 1963

It is well known that ascorbic acid influences the resistance and permeability of the capillary walls. We were interested in determining the effect of this compound on erythrocyte permeability. Traina [5] found that it protects erythrocytes from the hemolytic action of hypotonic salt solution in vitro. We investigated the effect of ascorbic acid on erythrocytes in vivo.

TABLE 1. Influence of Ascorbic Acid on the Resistance of Guinea Pig Erythrocytes

Erythrocyte resistance (%)	
Maximum	Minimum
Control	
0,34	0,52
0,34	0,50
0,32	0,50
0,32	0,48
0,34	0,48
0,34	0,50
0,34	0,52
0,30	0,50
0,32	0,50
$M \pm m$ 0,33±0,0047	0,50±0,003
Experimental	
0,30	0,50
0,30	0,48
0,30	0,52
0,32	0,48
0,28	0,50
0,30	0,50
0,34	0,50
0,28	0,48
0,32	0,50
0,30	0,48
0,30	0,50
0,32	0,48
0,30	0,48
0,32	0,50
0,32	0,50
0,30	0,48
$M \pm m$ 0,30±0,0035	0,49±0,003
$t = 4,17, P < 0,01$	$t = 2,325, P < 0,05$

METHOD

In our experiments we used guinea pigs weighing 450-500 g, which were kept on an ordinary diet (oats, hay, and beets). One group of animals (18 guinea pigs) had their diets supplemented with 10 mg of ascorbic acid daily, while the other group (10 guinea pigs) served as the control. The osmotic resistance of their erythrocytes was determined on the 11th day of the experiment, by Limbeck and Riberu's method [4].

It may be seen from the data presented in Table 1 that, while minimum erythrocyte resistance depended little on administration

TABLE 2. Change in Osmotic Resistance of the Erythrocytes of Nine Guinea Pigs under the Influence of 200 mg of Ascorbic Acid

Erythrocyte resistance (%)				
	Maximum		Minimum	
	Initial	2.5 h after administration of vitamin C	Initial	2.5 h after administration of vitamin C
	0,33	0,26	0,49	0,48
	0,32	0,24	0,48	0,50
	0,34	0,24	0,48	0,50
	0,34	0,28	0,50	0,48
	0,32	0,30	0,46	0,44
	0,30	0,30	0,46	0,44
	0,32	0,32	0,50	0,50
	0,34	0,34	0,50	0,48
	0,30	0,32	0,48	0,52
$M \pm m$	0,32±0,004	0,29±0,01	0,48±0,004	0,48±0,008

$t = 2,5, P < 0,05$

of vitamin C, maximum resistance was higher in those guinea pigs which received ascorbic acid, since hemolysis developed at a lower salt concentration in these animals than in the control. The difference is statistically reliable.

On the basis of our experiments it may be assumed that ascorbic acid administered to guinea pigs as a diet supplement promoted a decrease in the permeability of the red-blood-cell membrane.

In order to verify this we conducted an "overload" experiment. The osmotic resistance of the erythrocytes of nine guinea pigs was determined. The animals were then given 200 mg of ascorbic acid per os and the determination was repeated after 2-3 h.

Administration of 200 mg of ascorbic acid increased the osmotic erythrocyte resistance from 0.32 to 0.29% (Table 2).

The difference was statistically reliable. The results of the overload experiment thus confirmed the data cited above.

Our investigation showed that ascorbic acid not only strengthens the capillary walls [1-3], but apparently also promotes thickening of the red-blood-cell membranes.

LITERATURE CITED

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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.
