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CARTAS AL EDITOR

The Effect of Absence of Sodium on the Respiratory Metabolism of Rat Liver

Previous investigations in this laboratory dealt with the effects of absence of sodium over the respiratory metabolism, sodium being replaced with mannitol (1). A decrease in oxygen and glucose uptake was observed in tissue preincubated for one hour in medium without sodium (Krebs-Ringer-Tris-Mannitol); on the other hand no variation was shown in the rate of lactate production, the ratio lactate/glucose therefore increasing. These results indicated a damage to the tissue's respiratory system that could not be related to lack of transport of the substrate present in the incubation medium, since inhibition of oxygen uptake was also observed when there was no substrate in the incubation medium.

The effects of absence of sodium for one hour on the respiratory metabolism of rat liver slices of rat were subsequently studied [the methods used being similar to those previously used (1)] and it was observed that the oxygen uptake in medium without sodium (KRT/Man) is clearly inferior to that shown in medium with sodium. The difference showing more and more clearly as times passes, reaching

Table I. *Effect of preincubation of rat liver slices in absence of sodium.* Results on oxygen uptake are expressed in μM O_2/100 mg wet weight and the succinic dehydrogenase activity, in μM O_2/mg protein/min. Results are given as mean values ± standard error of the mean; the numbers in parenthesis indicate the number of experiments. Statistics according to Student's *t* method. $P < 0.001$.

PREINCUBATION	Time Hours		
	1	2	3
	Oxygen Uptake (μM O_2/100 mg w.w.)		
KRT/Na^+	3.18 ± 0.14 (23)	5.76 ± 0.20 (23)	7.92 ± 0.48 (11)
KRT/Man	2.41 ± 0.10 (10)	4.25 ± 0.31 (10)	5.87 ± 0.46 (10)
Inhibition %	24.22	26.21	25.89
	Succinic Dehydrogenase Activity (μM O_2/mg protein/min.)		
KRT/Na^+	0.0737 ± 0.0012 (32)		
KRT/Man	0.0595 ± 0.0012 (34)		
Inhibition %	19.26		

about 66.09 % after three hours. Simple preincubation of rat liver slices for one hour in KRT/Man solution, where sodium is being replaced with mannitol, also inhibits the oxygen uptake in 24.22% 26.21% and 25.89 % in the first, second and third hours, respectively; as measured against the subsequent oxygen uptake of the tissue in medium with sodium. The succinic dehydrogenasa activity of the same preparation was also measured (2), homogenized in sacarose 0.25 M, and an inhibition of this activity of the order of 19.26 % was found in tissue preincubated without sodium, as compared to the controls preincubated with sodium (Table I).

The inhibition of the tissue's respiration would perhaps be explained by the effects of the absence of sodium over the succinic dehydrogenasa activity in the internal membrane of the mitochondria.

References

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