XCIII. METABOLISM OF NORMAL AND TUMOUR TISSUE.

XIV. A NOTE ON THE METABOLISM OF MEDULLA OF KIDNEY.

BY FRANK DICKENS AND HANS WEIL-MALHERBE.

From the Cancer Research Laboratory, North of England Council of the British Empire Cancer Campaign, Royal Victoria Infirmary, Newcastle-on-Tyne.

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GYÖRGY *et al.* [1928] showed that medulla of kidney belongs to the most strongly glycolysing tissues. They found for the anaerobic glycolysis of medulla of kidney of the rat values of $Q_{CO_2}^{N_2} = 25{\cdot}6$ as average and 34·1 as maximum. The aerobic glycolysis of the slices in Ringer solution was found to amount to $Q_{CO_2}^{O_2} = 15$ to 17. This aerobic glycolysis however was stated by these authors to disappear when serum was used instead of Ringer solution.

In the course of investigations on the glycolysis of animal tissues we found it desirable to reinvestigate these little-known observations. We could confirm them fully with the exception of one important point: we did not find a disappearance of aerobic glycolysis in serum, even in the serum of the same species. As a matter of fact the aerobic glycolysis in serum was exactly the same as in Ringer solution. The respiratory quotient was determined in some instances and found to be about unity, thus confirming the rule that normal tissues with high glycolysing power have a R.Q. of 1.

Medulla of kidney therefore provides in addition to retina another example of normal "resting" tissue with an anaerobic type of metabolism. But in contrast to retina where a great vulnerability of the highly specialised cells may be anticipated, kidney medulla consists of a system of conducting tubules of simple epithelium, where no abnormal susceptibility appears likely.

This is relevant to the theories which regard an anaerobic type of metabolism as associated with growth or even with malignant growth only. We suggest that the cause of an anaerobic type of metabolism is in all such cases merely a disparity between blood supply, *i.e.* oxygen supply, and energy requirements of the tissue *in vivo*.

Methods.

Slices were cut from that part of the kidney only which is known as the pyramid. The metabolism was measured in the Warburg apparatus at 37·5° in the usual way. Serum was inactivated for 2 hours at 56°, glucose was then added to give a concentration of 0·2 %. R.Q. was determined by the method of Dickens and Šimer [1930].

RESULTS.

Species	Medium	Hours	Q_{O_2}	Q_{CO_2}	$Q_{CO_2}^{N_2}$	R.Q.
Guinea-pig	Bicarb.-glucose-Ringer	1st	− 7·4	14·2	33·6	—
		2nd	− 8·6	13·3	25·6	—
		3rd	− 7·1	12·0	20·8	—
	Bicarb.-glucose-Ringer	1st	− 5·7	15·7	26·7	—
		2nd	− 9·2	17·1	26·7	—
		3rd	− 7·1	9·3	19·7	—
	Horse serum	1st	−10·0	17·4	28·6	—
		2nd	− 5·4	11·9	23·3	—
	Horse serum	1st	− 7·0	13·5	28·2	—
		2nd	− 6·5	10·8	25·9	—
	Guinea-pig serum	1st	− 9·3	14·0	29·4	—
		2nd	− 9·4	11·6	21·8	—
Cat	Bicarb.-glucose-Ringer	1st	− 2·7	9·5	13·1	—
		2nd	− 1·6	6·6	11·9	—
	Bicarb.-glucose-Ringer	1st	− 0·4	7·5	13·9*	—
Guinea-pig	Phosphate-glucose-Ringer	1st	−10·3	—	—	
		2nd	− 8·7	—	—	
		3rd	− 8·9	—	—	0·99
		4th	− 8·9	—	—	
		5th	− 8·7	—	—	
	Phosphate-glucose-Ringer	1st	−10·1	—	—	
		2nd	− 9·6	—	—	
		3rd	− 9·2	—	—	0·98
		4th	− 9·5	—	—	
		5th	− 9·3	—	—	

* In absence of glucose $Q_{CO_2}^{N_2} = 2{\cdot}4$ (falling).

REFERENCES.

Dickens and Šimer (1930). *Biochem. J.* **24**, 905.
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