IX. THE FATE OF DESOXY-GLUCOSE IN THE RABBIT.

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It has been shown [Winter, 1926] that the injection of glucal into rabbits during insulin convulsions brings about complete recovery to normal with raising of the blood-sugar. The possible lines on which glucal is effective in restoring the animal may be, (1) direct oxidation, (2) conversion into glucose or mannose, (3) formation of desoxy-glucose, which is a reducing sugar, but which differs from glucose in that two H atoms are attached to the second carbon. The possibility of the metabolism of desoxy-glucose has been tested by injection into rabbits in convulsions. The substance was prepared by the method of Bergmann, Schotte, and Lechinsky [1922], by the action of acid on glucal. The glucal was however allowed to crystallise, and was drained on a porous tile before treatment with acid. A few grams of the diphenylhydrazone [Bergmann and Schotte, 1921] were first prepared, and the compound decomposed with benzaldehyde. By this means a crystalline sample of the sugar was readily obtained, and this was used for nucleating the main preparation. The final product gave $[\alpha]_{5461} = +59.5^\circ$. The sugar was dissolved in a little water, and injected into the animals when the convulsions were well established. In one case a temporary improvement in the condition of the animal was noted, soon followed by a relapse. In no case has complete recovery been effected, though the subsequent administration of glucose will restore the animal permanently, showing that the desoxy-glucose has no toxic effect. There is a rise in the value for the blood-sugar following the injection of desoxy-glucose, but since there is little alteration in the condition of the animal it is probable that the increased amount of reducing substance is almost entirely due to the presence of the unaltered compound, and that the substance is not capable of metabolism by the tissues. The urine is found to give a green pine-shaving reaction, and in the HCl modification of the α -naphthol test a purple colour develops as soon as the mixture is warmed. It has been found that glucal and desoxy-glucose behave like the pentoses in respect to this reaction. There is however no possibility of confusion if pentoses are estimated in the presence of glucal, since the distillation of 0.03–0.05 g. of glucal with hydrochloric acid gave no weighable precipitate on adding phloroglucinol and allowing to stand. The colour reaction with

α -naphthol is evidently not due to the formation of furfural. The urine after shaking with charcoal reduced Fehling's solution vigorously. In one case a Wood-Ost estimation, which is less likely to be affected by nitrogenous compounds, indicated 0.33 % of sugar reckoned as glucose, following the administration of desoxy-glucose. Since the animal had not recovered from the insulin convulsions, it is likely that the main reduction was due to the injected sugar. The excretion of glucose during insulin hypoglycaemia is inconceivable. No precipitate of diphenylhydrazone could however be obtained when an alcoholic solution of diphenylhydrazone was added to the urine, the mixture being filtered and allowed to stand after shaking for 4 hours.

Weight kg.	Time	Protocols	Blood-sugar %
1.5	9.50	—	0.085
	10.00	3 mg. ins. HCl	—
	2.25	2 mg. ins. HCl	—
	3.20	—	0.059
	6.00	Convulsions	0.050
	6.20	0.5 g. desoxy-glucose	—
	7.45	Still collapsed. 0.5 g. desoxy-glucose	—
	9.15	Violent convulsions	0.060
	9.30	2 g. glucose	—
	10.30	Appeared normal	0.083
1.1	10.00	—	0.091
	10.10	3 mg. ins. HCl	—
	1.00	Convulsions	0.034
	1.20	1.0 g. desoxy-glucose	—
	2.00	Better, able to eat	—
	2.30	Collapsed	—
	2.45	1.0 g. desoxy-glucose	—
	4.45	—	0.11
	6.45	Still collapsed	0.062
	8.30	Animal died	—
1.1	9.45	—	0.089
	9.55	3 mg. ins. HCl	—
	12.30	Convulsions	0.041
	12.45	1.0 g. desoxy-glucose	—
	2.45	Collapsed	0.058
	4.00	Animal died	—

REFERENCES.

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