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The physiological behavior of glucosane.

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The anhydrosugar, glucosane ($C_6H_{10}O_5$), and its polymer, tetra-glucosane, are widely used in Germany in the dietary treatment of diabetes. These substances are reputed to be oxidized by the diabetic since, according to Nothmann and Kühnau¹ and others, no extra urinary sugar results after its administration, no rise in blood sugar occurs thereafter, and an antiketogenic and protein sparing action follows its ingestion. It is likewise claimed to be glycogenic.

In the present paper we have investigated the behavior of "Salabrose," a commercial tetra-glucosane preparation obtained from Germany, and have administered it orally, subcutaneously, and intraperitoneally to normal and phlorhizinized dogs. In order to determine whether glucosane might be excreted unchanged in the urine or feces following its administration, it has been quantitatively determined by reversion to glucose by boiling for a short interval with dilute mineral acid. It was found that boiling for 15 minutes with 20 or 30 per cent HCl destroyed appreciable quantities of this substance, while boiling with a HCl concentration of 5 per cent of the same length of time completely hydrolyzed it to glucose. After neutralization the glucose obtained by this hydrolysis was determined by the usual methods. In diabetic urines this procedure was found to be satisfactory, the glucosane being equivalent to the total glucose (after hydrolysis) minus the preformed glucose.

When 30 gram doses of salabrose were fed to normal or phlorhizinized dogs no increase in the glucose excretion was noted, a result in harmony with the earlier reported German work. However, no rise in respiratory quotient was noted in normal or phlorhizinized dogs following its oral administration,

¹ Nothmann, M., and Kühnau, J., *Die Therapie der Gegenwart*, 1925, ix, —

indicating that only a slight oxidation, if any, occurred after its ingestion. The same amount of glucose, when fed to a fasting dog, resulted in a prompt rise in respiratory quotient.

On seeking an explanation of the fate of this substance it was found that amounts often larger than 50 per cent of that ingested were excreted unchanged in the feces. Often times diarrhea resulted following its ingestion, but even when this did not happen large amounts were found unchanged in the feces. Five to 10 per cent of the total amount ingested was usually found in the urine, during the first 6 hours after its ingestion, while no additional measurable amount was excreted in the later hours. The 30 or 35 per cent unaccounted for is probably excreted slowly in the urine or feces or may possibly in part be destroyed by intestinal bacteria.

In order to determine whether glucosane is capable of being utilized in case it were absorbed, it was injected intraperitoneally and subcutaneously in normal dogs. In both cases the glucosane was excreted unchanged in the urine, a complete recovery being obtained in from one to three days thereafter. These latter experiments confirm those previously discussed in indicating that glucosane can neither be changed to glucose nor oxidized as such in the dog. If glucosane be oxidized in diabetic patients it can be proved only by the demonstration of an increased respiratory quotient in the diabetic following its ingestion, coupled with the proof of its absorption from the alimentary tract and its non-elimination by the kidneys.

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The prevention and cure of tetany by oral administration of magnesium lactate.

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It was demonstrated in a recent series of experiments¹ that strontium lactate administered orally to parathyroidectomized dogs greatly delays the onset of tetany, and may even bring

¹Swingle, W. W., and Wenner, W. F., *Am. J. Physiol.*, 1926, lxxv, 372-8.