

## 15 (2247)

The behavior of inorganic phosphate in the blood and urine of normal and diabetic subjects during carbohydrate metabolism.

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Harrop and Benedict<sup>1</sup> and Wigglesworth, Woodrow, Smith and Winter<sup>2</sup> have recently called attention to the fall of the concentration of the inorganic phosphate in the blood of human subjects and experimental animals following the use of insulin. In the course of various studies on diabetes, particularly in connection with the studies on the respiratory exchange of normal and diabetic subjects following the ingestion of glucose, glycerol, calcium hexose phosphate and calcium glycerophosphate<sup>3</sup> and the respiratory exchange following the administration of insulin and epinephrin<sup>4</sup> data were accumulated on the changes of the inorganic phosphate in the blood and urine under the above enumerated experimental conditions. It was found that in normal human subjects the ingestion of 50-100 gm. of glucose and the intravenous injection of 3.5 units of insulin, also the subcutaneous injection of 0.5 cc. of 1:1000 solution of epinephrin caused a marked fall in the inorganic phosphate of the blood, and a simultaneous fall of the rate of excretion of phosphate in the urine. With the injection of epinephrin, however, in normal subjects the fall of the blood phosphate was frequently accompanied by a rise in the rate of urinary excretion of phosphate. The excretion of phosphate was most singularly depressed by the

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<sup>1</sup> Harrop, G. A., and Benedict, E. M., *PROC. SOC. EXP. BIOL. AND MED.*, 1923, **xx**, 430.

<sup>2</sup> Wigglesworth, V. B., Woodrow, C. E., Smith, W., and Winter, L. B., *J. Physiol.*, 1923, **lvii**, 447.

<sup>3</sup> McCann, W. S., and Hannon, R. R., *The Johns Hopkins Hosp. Bull.*, 1923, **xxxiv**, 73, and McCann, W. S., Hannon, R. R., Perlzweig, W. A., and Tompkins, E. H., *Arch. Int. Med.*, 1923, **xxxii**, 226.

<sup>4</sup> Lyman, R. S., Nichols, E., and McCann, W. S., *J. Pharm. and Exp. Therap.*, 1923, **xxi**, 343.

ingestion of glycerol. While in all of the cases studied this retention of phosphate was accompanied by a rise of the respiratory quotient, indicating increased carbohydrate metabolism, with the ingestion of glycerol the marked retention of phosphate was accompanied by a lowered respiratory quotient.

With diabetic subjects it was frequently observed that the ingestion of glucose or the injection of insulin did not cause a retention of phosphate especially when the blood sugar curves and the respiratory exchange indicated that there was no increased catabolism of carbohydrate. No general relationship was found between the retention of phosphate and the reaction of the urine as measured by the total titratable acidity. The determinations of reducing sugar and of phosphate in blood filtrates before and after hydrolysis with acid failed to reveal the presence in the blood of a carbohydrate-phosphate compound at the height of phosphate retention. If such compounds as hexose phosphate are formed in the process of the oxidation of carbohydrates they are probably to be found in the liver and muscles.

Our data furnish obviously further support to the theory of the close participation of the phosphate ion in the metabolism of carbohydrates.

## 16 (2248)

### **The oxygen consumption of thyroid and diiodotyrosine-fed tadpoles.**

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It has been known for some years that thyroid-fed tadpoles undergo precocious metamorphosis, and more recently the fact has been demonstrated that diiodotyrosine has a similar effect upon amphibian larvæ. Students of amphibian metamorphosis have assumed that an increase in metabolic rate occurs during transformation, and the statement is even made that metamorphosis is due to increased metabolism. So far as the writer is