

jected protein-deficient mothers were obtained in pregnant hypophysectomized rats only when the injection period was extended 2 days. This difference in hormone requirement probably reflects continued low levels of circulating pituitary gonadotropins in protein-deficient animals. Number of living young of hypophysectomized mothers was reduced compared to that of rats hypophysectomized later in gestation(6), possibly because of decreased pituitary gonadotropins or operative trauma during first half of pregnancy. Fetal weights in both hypophysectomized groups, however, were subnormal.

Summary. Even in the complete absence of dietary protein the placenta can successfully carry fetuses to term provided estrone

and progesterone are administered on days 5-9 of pregnancy. Pregnancy can be maintained also in rats hypophysectomized on day 5 of gestation when supported with hormones between days 5-11.

1. Nelson, M. M., Evans, H. M., *J. Nutrition*, 1953, v51, 71.
2. ———, *Endocrinol.*, 1954, v55, 543.
3. Pencharz, R. I., Long, J. A., *Am. J. Anat.*, 1933, v53, 117.
4. Srebnik, H. H., Nelson, M. M., Simpson, M. E., *Proc. Soc. Exp. Biol. and Med.*, 1959, v101, 97.
5. Kinzey, W. G., Srebnik, H. H., *Anat. Rec.*, 1963, v145, 249.
6. Knobil, E., Caton, W. L., *Endocrinol.*, 1953, v53, 198.

Received May 24, 1963. P.S.E.B.M., 1963, v114.

Relative *in vitro* Activities of Intestinal Glucose Uptake and Monophosphate Esterases.* (28613)

A. S. NUNN, JR., M. SAYEED, J. McNALLY, R. FALLOT
(Introduced by G. C. Ring)

Department of Physiology, University of Miami, Miami, Florida and Department of Physiology, St. Louis University, St. Louis, Missouri

In the albino rat the rate of glucose absorption decreases from a maximum in the upper half of the small intestine to the terminal ileum(1). It has been suggested that the rate limiting component for glucose absorption might be identified if this component were distributed throughout the small intestine in a pattern similar to the glucose absorption gradient.

This study was designed to determine if the monophosphate esterase activity along the small intestinal length would correlate in an obvious manner with the absorption gradient for glucose.

Methods. By use of a modification of the method of Crane and Wilson, glucose absorption was determined at eight consecutive levels of small intestine in twenty-seven fasted, male albino rats. This absorption technique

has been described in detail(2). Monophosphoesterase activity at eight levels of small intestine was determined in ten animals. This technique involved the hydrolysis of paranitrophenylphosphate by mucosal homogenates obtained from areas adjacent to those used for glucose absorption.

Results. The statistical means for both glucose absorption and monophosphoesterase activity are shown in the figure. Segment 1 is the duodenum and segment 8 is the terminal ileum. The decline of absorptive activity found in the first five segments was of statistical importance only in the case of segment 1 *vs* segment 2. From the fifth segment to the terminal ileum each successive segment showed a linear and statistically significant decrease in glucose uptake. The mean monophosphate esterase activity at corresponding intestinal levels decreased precipitously throughout the first seven segments. Only the mean difference of segment 2 *vs* segment 3 was not statistically established.

* This work was supported by NIH and by the U. S. Army Research and Development Command, Department of the Army, Under Research Contract No. DA-49-193-MD-2415.

Segment 8 had a slightly greater mean activity than segment 7, but this difference was not statistically supported.

Discussion. The monophosphoesterase activity gradient along the small intestine does not exhibit the necessary characteristics to be the direct rate limiting component for the active uptake of glucose. The maximal absorption of glucose in the upper half of the small intestine was accompanied by an exponential decrease in phosphatase activity. Preliminary studies utilizing various concentrations of phosphate ester assured that at all times during the thirty-minute incubation period the velocity of the reaction would remain constant. The decrease in the enzyme activity observed in the present experiments (see figure) may therefore be attributed to a decrease in the concentration of enzyme rather than to possible substrate deficiency. As these areas of decreased monophosphate esterase show no corresponding decrease in glucose absorption it follows that the relationship between the two processes is not a direct one. This observation is in agreement with the report of Crane and Krane, which has shown that the absorption of glucose analogues incapable of phosphorylation is similar to the absorption of D-glucose(3). Obviously this study does not rule out the possibility that certain of the monophosphoesterases may be involved in the hydrolysis of high energy phosphate compounds indirectly

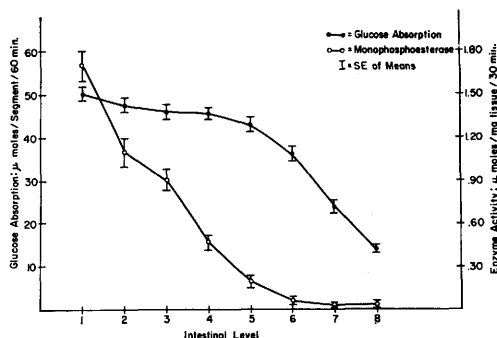


FIG. 1. Glucose and monophosphoesterase activity at eight levels of rat intestine.

involved in the energy requiring "uphill" transport of glucose by the intestinal mucosa(1).

Conclusion. The dissimilarity of the glucose absorption rate and concentration of monophosphoesterase along the rat small intestine indicates that no direct relationship exists. This would tend to support the finding of Crane and Krane in regard to the phosphorylation of glucose in its absorption and subsequent transport by the intestinal mucosa.

1. Baker, R. D., Searle, G. W., Nunn, A. S., *Am. J. Physiol.*, 1961, v200, 301.
2. Crane, R. K., Wilson, T. H., *J. Appl. Physiol.*, 1958, v12, 145.
3. Crane, R. K., Krane, S. M., *Biochim. Biophys. Acta*, 1956, v20, 568.

Received May 29, 1963. P.S.E.B.M., 1963, v114.

Identification of Coxsackie and ECHO Virus Isolates with Fluorescent Antibody. (28614)

M. H. HATCH (Introduced by C. C. Shepard)

Communicable Disease Center, Public Health Service, U. S. Dept. of HEW, Atlanta, Ga.

A fluorescent antibody (FA) method for identification of poliovirus isolates has been described(1). This paper presents data concerning the use of FA for identification of certain Coxsackie and ECHO virus isolates. A preliminary report of these results has been given(2).

Materials and methods. The experimental

approach was to study a series of stool specimens from which enteroviruses had previously been isolated and identified by routine methods involving neutralization tests. The 70 specimens studied were selected to contain in most instances one of the 6 enteroviruses against which fluorescent antibodies had been prepared. Fourteen stools contain-