



FIG. 4. Marked clumping of red cells in the capillaries of the medulla.

5°C. A larger series, 7 female and 2 males grown at 10°C. all show precisely similar changes varying only in the degree of severity.

The mechanism which leads to the development of tubular necrosis is not clear. The presence of agglutinated and hyalinized red corpuscles in the vascular channels and in the glomeruli suggests at once the immediate cause. All of the 13 animals examined histologically reveal this hemagglutination with (probably ensuing) necrosis of the tubular epithelium. The deposition of calcium in some of the areas is no doubt secondary to the necrosis. As for the cause of the initial hemagglutination we have no evidence to offer at this time.

7663 C

Rate of Absorption of Glucose from the Intestinal Tract of the Rabbit.

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We concluded elsewhere¹ that the true relation of the rate of absorption of glucose from the intestine to the concentration in this

¹ MacKay, E. M., and Bergman, H. C., *J. Biol. Chem.*, 1933, **101**, 453.

TABLE I.
Rate of Absorption of Glucose from the Intestinal Tract of Rabbit. Each Figure is an Average of a Group of 3 Rabbits.

Hr.	Aver. Body Wt.	Dose of Glucose	Glucose in Stomach at end of period	Conc. Glucose in Stomach	Glucose in Intestine at end of period	Aver. amt. glucose available for absorption during period	Glucose absorbed during period	Aver. glucose absorption per hour of period	Approx. amt. of glucose absorbed each hour	Approx. amt. glucose available for absorption each hour
	gm.	gm.	gm.	%	gm.	gm.	gm.	gm.	gm.	gm.
1	1670	8.85	4.16	7.06	2.08	4.69	2.61	2.61	2.61	4.69
2	1630	8.15	2.81	4.82	1.64	5.34	3.70	1.85	1.09	2.73
3	1690	8.45	2.21	4.24	1.90	6.24	4.34	1.44	0.64	2.54
4	1630	8.15	2.03	3.26	1.12	6.12	5.00	1.25	0.66	1.78
5	1605	8.02	0.87	2.02	0.84	7.15	6.31	1.26	1.31	2.15
6	1600	8.00	0.11	0.35	0.67	7.89	7.22	1.20	0.89	1.58

organ can only be established in experiments in which the stomach contents are considered separately. Attempts to carry out such experiments on rabbits were partially unsuccessful for no reasonable period of starving will free the gastrointestinal tract of debris and these animals do not tolerate starvation well unless roughage is supplied. One finding was of interest, namely, support of our contention¹ that the rate of glucose absorption per unit time from the intestinal tract of rats is not constant but dependent on the amount and concentration of glucose administered and always decreases with time after the sugar is given. The Cori² and others³ have presented polemical evidence against this view.

A typical experiment is presented in Table I. Each figure is an average of a group of 3 albino male rabbits of approximately the same age and weight. Each animal received 30 cc. of 5% agar-agar per day during a 3-day starvation period preceding the experiment. To estimate the glucose absorption Cori's method⁴ was used with the modification that the stomach contents were examined separately and the concentration of the glucose as well as the amount in this organ determined. The rabbits were given 10 cc. per kilo body weight of a 50% glucose solution. They were killed by air embolism, air being injected into the ear vein. When killed the stomach and intestine contained considerable swollen agar-agar. This vitiated the importance of concentration changes. It is interesting, however, that within even a single hour the glucose concentration in the stomach becomes so greatly reduced. Ravdin, Johnston and Morrison⁵ have noted this tendency for dilution to a rather uniform figure.

Our doses of glucose were given in relation to body weight. In the rat the rate of absorption is more dependent on body surface than body weight.¹ This is also probably true for the rabbit but since no reliable body surface factor was available for this species and all of our animals weighed very nearly the same we have used body weight. Since the average weights of all the groups were for practical purposes identical the results have simply been expressed per rabbit.

Maddock *et al.*³ have definitely demonstrated that no glucose is absorbed from the stomach. Consequently we have treated this

² Cori, C. F., and Cori, G. T. *Ann. Rev. Biochem.*, 1933, **111**, 151. Stanford University Press.

³ Maddock, S. J., Trimble, H. C., and Carey, B. W., Jr., *J. Biol. Chem.*, 1933, **103**, 285.

⁴ Cori, C. F., *J. Biol. Chem.*, 1925, **66**, 691.

⁵ Ravdin, I. S., Johnston, C. G., and Morrison, P. J., *Am. J. Physiol.*, 1933, **104**, 700.

organ as a reservoir. Our results show very clearly from the average rate of absorption per hour for the various periods that the rate of glucose absorption is greatest during the first hour after giving the glucose and decreases each hour thereafter. For at least the first 4 hours after administering the glucose this fall in the absorption rate cannot be due to any lack of glucose for absorption. Since there is no absorption from the stomach the amount of glucose available for absorption each hour is that which reaches the intestine plus any unabsorbed during the preceding hours. There is a tendency for a relation in a general way between the absorption rate and the amount of glucose available for absorption. That this is not more clear-cut may be due to the fact that not only is the amount but also the concentration of glucose leaving the stomach becoming less each hour.

These results in so far as they are comparable confirm similar experiments on the rat.¹ The results in both species coincide well in many aspects with the experiments of Ravdin *et al.*⁵ on the rate of glucose absorption from isolated intestinal loops in the dog.

Summary. The rate of absorption of glucose from the intestinal tract of the rabbit decreases with time after the glucose is administered. This is apparently related to the decreasing amount of glucose entering the intestine from the stomach each hour for there is a relation between the rate and amount of glucose available for absorption.

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Observations upon Hypophysectomized-Depancreatized Cats.

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Houssay and Biasotti,¹ Barnes and Regan² and others have demonstrated the prolongation of life and amelioration of the diabetes that follows total pancreatectomy in the hypophysectomized dog. During the last few months observations have been made upon 2 cats in which total pancreatectomy was performed 2 weeks after hypophysectomy. There was no loss of weight in the period be-

¹ Houssay, B. A., and Biasotti, A., *Endocrinology*, 1931, **15**, 511.

² Barnes, B. O., and Regan, G. F., *Endocrinology*, 1933, **17**, 522.