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Digestion and absorption of cereal proteins in the human alimentary tract.

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Rapidity of digestion of the protein contained in different cereal breakfast foods was determined in human subjects, partly by the emptying time of the stomach as measured by the total nitrogen in its contents obtained at successive intervals after a cereal breakfast, and partly by the rate of nitrogen excretion through the kidney following the meal. The former method obviously gives information chiefly upon the motility of the stomach.

Each of four subjects ingested 25 grams of dry cereal, after cooking a uniform length of time, with cream and sugar and in some cases coffee. Before the meal a Rehfuss tube was introduced and the fact established that the stomach was empty. The tube was left in place and one hour after the meal the contents of the stomach were completely removed by the use of large amounts of wash water. Each subject repeated the experiment on the following morning with the same cereal and with exactly similar technique, except that the stomach was emptied at one and a half hours. On succeeding mornings the time was 2 hours, 2½ hours, etc., until the stomach was empty. The next week each subject took a different cereal with another change for the third, and still another for the fourth week. The cereals employed were a milled wheat product, a whole wheat product and two oats products.

The differences in stomach emptying time amongst the four cereals were small, much less than those found amongst the dif-

ferent subjects for the same cereal. An average of all the subjects for all the cereals indicated that at the end of one hour 35 to 45 per cent of the ingested cereal protein had passed out of the stomach, at two hours about 75 per cent and at three hours the average stomach was empty. Oats protein tended to leave more rapidly during the early part of digestion but was delayed in the later part.

Reliable data on rate of absorption were obtained from two subjects in connection with work and dynamic action experiments. The nitrogen of the milled wheat product regularly appeared sooner than the nitrogen from ingested oats. This was confirmed for the carbohydrate of the cereals by its effects upon the respiratory quotient.

Figures on the extent to which the cereal proteins are absorbed in the entire alimentary tract were obtained from experiments in which the fecal nitrogen and its metabolic fraction were known. From these data and the figures for ingested nitrogen the percentage absorption or utilization of the cereals are as follows: Milled wheat product 99.5 per cent, whole wheat product 87.2 per cent, oat product 86.7 per cent. These figures apparently verify the generally accepted opinion that roughage, necessary as it is, decreases the percentage of utilization.

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The rate of glycogen formation in the liver during absorption of fructose and galactose.

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The rate of glycogen formation in the liver of the rat during the absorption of glucose from the intestine, and the influence of insulin on the rate of glycogen formation has been studied on a former occasion.[1] It seemed of interest to repeat these experiments during the absorption of fructose and galactose.

[1] PROC. SOC. EXP. BIOL. AND MED., 1926, xxiii, 286.